MODEL AIRPLANE NEWS

OCTOBER 1942 · 20 CENTS

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Special to MODEL AIRPLANE NEWS

MOST important news of the month has been the ever-increasing nearness of the long-awaited "second front" now publically acknowledged by our military leaders and particularly those of the United Nations. Perhaps as you read this, American planes, tanks and guns will be rolling against the Nazis in a devastating thunder of crushing strength. Germany is our enemy No. 1 and with her downfall will come those of here parasitic brothers in blood, Japan and Italy. And this Second Front, which has already begun, will be an aerial second front with wave upon wave of giant bombers and fast fighters mowing down the opposing planes, tanks and guns as the harvester with his scythe. The planes are there, the pilots are ready, now we only await the exact strategic moment and Hitler's doom is sealed!

British plane production figures, given by Lieut. Gen. Gordon Nevil MacReady, head of the British Army Staff in Washington, reveal that during 1941 the British aircraft industry delivered more than 10,000 military airplanes to service squadrons.

Motorless troop-transport gliders are being built on a mass production basis at Wichita plant of Boeing Airplane Company, it was recently announced by the Army Air Forces.

The airlines are now being forced to use single-engine aircraft on many of their routes it was recently revealed with the announcement that Northwest Airlines has placed into service single-engine air mail operations on their route from Twin Cities (Minneapolis and St. Paul) to Duluth and Superior. The planes were formerly used for pilot check flight instruction.

Army Air Forces transport planes have flown five million miles during the past five months to rush equipment and personnel to strategic points in Australian operational areas. One air freighter carried 300 tons of supplies 2,000 miles in a single month.

One-fourth of all the airplanes operated by the Royal Air Force throughout the world are American made as are 13 percent of the Royal Air Force planes being used on the home front in the British Isles, the British Information Service states.

According to Major Nathaniel F. Silsbee of the Army Air Forces, one sixth of the Luftwaffe consists of transport airplanes. New ones are being turned out at an estimated rate, based on latest confidential reports from the Reich, of about 1,000 a month. At the same time, tens of thousands of troop and cargo carrying gliders are being produced.

With our aircraft production at an admitted 50,000 per year, Donald M. Nelson of the War Production Board states that "It will be a very rapid climb from now on. For approximately three or four months we will be in a period of very rapid climb. The real test is whether we will get enough accelerated production in the next three or four months. If we do, I am sure we are on our way."

Fairchild AT-13, twin-engined crew trainer built entirely of duromold except for certain members supporting bombing, machine guns, camera and other equipment, has been successfully test flown at Hagerstown, Maryland. This plane is one of the largest and fastest designed for training and is intended to meet the necessity of training bombing crews as a unit team.

The Army has accepted a new plastic-plywood version of the Vultee BT-13 and BT-15 training plane. Built almost entirely of wood, with the exception of a main fuselage framework of welded steel tubing, the new ship is said to conserve enough strategic materials to build more than a dozen like itself.

Appointment of Col. C. R. Smith, formerly president of American Airlines, as Chief of Staff of the recently reorganized Air Transport Command has been announced by the Army Air Forces in Washington. Under the reorganization the Army Air Forces Ferrying Command, charged with the task of delivering American aircraft to Allied fronts and the contract cargo division were consolidated as the Air Transport Command. Duties also include ferrying of aircraft within and without the United States and the transportation by air of personnel, material and mail for the War Department.

General George E. Stratemeyer has been appointed Chief of Staff of the Army Air Forces, according to an official announcement. Other appointments include Major General Lorenzo D. Gasser to the Army Services of Supply and General Carl Spaatz as Chief of the Army Air Forces in Europe as well as General Ira C. Eaker as head of the Army Air Forces Bomber Command on the continent.

Major William L. Van Dusen, 48, one of Consolidated Aircraft's top executives before he joined the Army Air Forces, was killed recently when he leaped from a blazing plane over the New Mexico desert. Van Dusen, well known throughout the aviation world, was personnel director and General Manager for the giant Consolidated Aircraft plant in San Diego. He was called to active duty from his Army reserve post only one week before his death and was promoted to his present rank. By coincidence he fell to his death only 200 miles from his birthplace, Lordsburg, N.M.

Developed by a 55-year old Pennsylvania State College professor, a new compound is expected to facilitate the production of high-octane aviation gasoline, it was recently disclosed. Discovered by Dr. Joseph H. Simons, professor of physical chemistry at Penn State, the substance is known as hydrogen fluoride, a compound derived from fluorine, a poisonous, highly corrossive gas described by chemists as the most active of

(Continued on page 61)

14TH YEAR OF PUBLICATION

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Edited by
Charles Hampson Grant

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MUST LAUNCH 185,000 WARPLANES

The aviation industry is mustering every facility of the world's greatest industrial civilization to fulfill President Roosevelt's far-sighted demand for 185,000 fighting planes. Because the demand exceeds the supply of skilled aircraftsmen, many inadequately trained men are finding single-phase jobs through cheap "quickie" courses. BUT—the vital supervisory positions can only be held by men with the thorough long range training to reach any objective to which they may be assigned . . . the men who have chosen aviation as a career—not an expedient. They are the only men of this huge production army who are indispensable to America's war effort and who will continue to be indispensable when the aircraft industry steps down from war to peace schedules.

The executives who have made aviation THEIR career know the value of each man is governed by two factors: his intelligent sincerity in selecting aviation as his life work, and THE ABILITY AND EXPERIENCE OF THOSE WHO TRAIN HIM FOR THAT CAREER. They know that Curtiss-Wright Technical Institute graduates are—and for many years have been—thoroughly qualified to fill the industry's exacting requirements.

Located in the very center and a very important part of Southern California's great aircraft industry, with its more than two billion dollars in unfilled orders, Curtiss-Wright Tec has come to be recognized as the nation's leading institution for the training of Aeronautical Engineers and Master Mechanics.

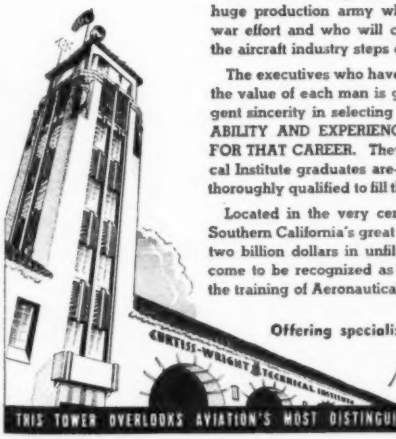
Mr. Donald Douglas, President of the great Douglas Aircraft Company, chose this school for his own son's training, which pointedly indicates the high standing Curtiss-Wright Tec has attained in the aircraft industry since its establishment in 1929.

It is imperative that before you invest in a course of career training you determine what the returns will be on your investment . . . for your choice of a school in which to take your training will determine how much money you will make all the rest of your life.

Curtiss-Wright Tec's career training is carefully designed to do just one thing:—TO MAKE MONEY FOR YOU, so upon graduation you can be independent and self-supporting for life. Our thousands of successful graduates have proven that Curtiss-Wright Tec training gets results and always pays, since it trained them in advance for the highest position they could ever expect to occupy. It can do the same for you.

This school has never guaranteed positions for its graduates, but practically every graduate has obtained immediate employment and is advancing rapidly. The demand for our graduates far exceeds the supply, and we honestly believe that every student who enrolls here will be able to obtain, with our assistance, immediate employment upon graduation.

WARNING!—"Don't miss the boat." The greatest opportunity in your lifetime exists today! There never was such an opportunity in aviation for you: there may never be another. A position awaits you. Insure for yourself a steady income and independence for life. DON'T FOLLOW—LEAD! Send in your enrollment before you "miss the boat."



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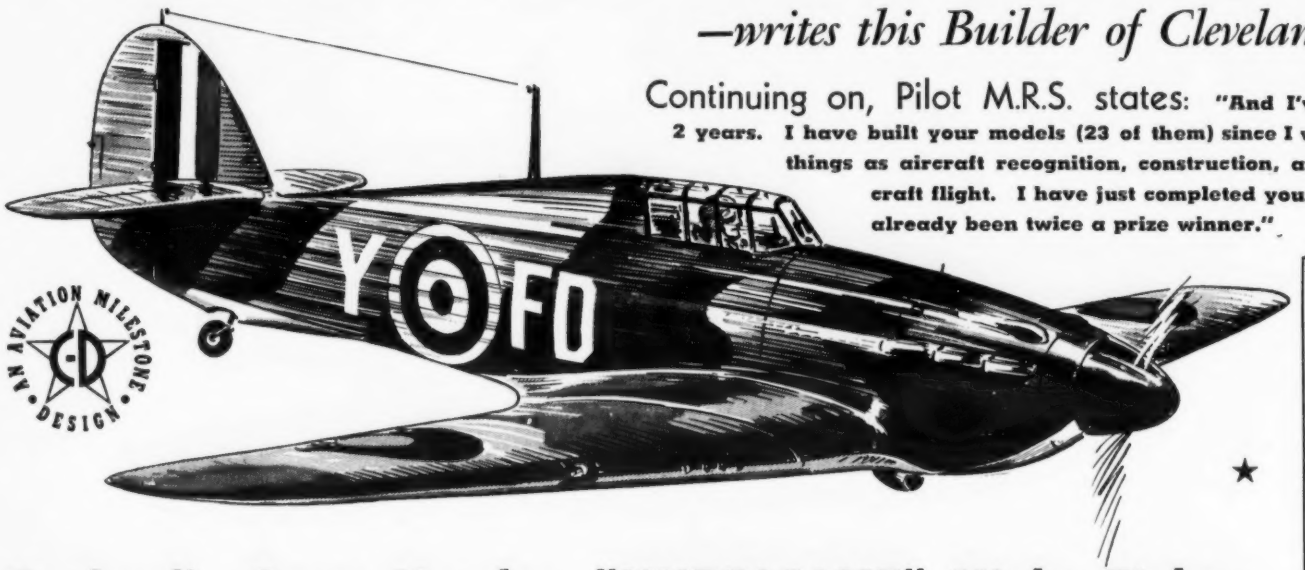
"I am Now a Pilot in the R.A.F. Ferry Command"

—writes this Builder of Cleveland-Designed Models

Continuing on, Pilot M.R.S. states: **"And I've been in this service for over 2 years. I have built your models (23 of them) since I was 14—and to them I credit such things as aircraft recognition, construction, and a general knowledge of aircraft flight. I have just completed your Hawker 'Hurricane,' which has already been twice a prize winner."**



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Now, Read What This Canadian Air Cadet Says:

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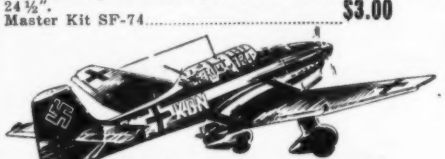
Air Cadet E. F.

England's Great Hawker "HURRICANE" Night Fighter

Strikingly authentic scale model, with 30" span, of Britain's top fighter, the plane that broke up so many of the Nazi night attacks on England. Model is a beauty in flight, with its clean-cut streamlining due to retractable landing gear. Our drawings enable you to build it either with 8 flush mounted machine guns, or four 20 mm. cannons; also air scoop employed in African desert fighting. C-D "Master" Kit SF-78..... **$3.00**

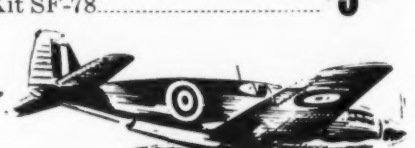
GERMAN ME-109 MESSERSCHMITT

Nazis mass production fighter. Good flyer. Span 24½". Master Kit SF-74..... **$3.00**



GERMAN JU-87 STUKA

The famous dive bomber used so widely by the Nazi Germans all over Europe, at Crete and now in Africa. A really historic design as are all models listed here. Span 30 3/16". C-D "Master" Kit SF-84..... **$3.50**

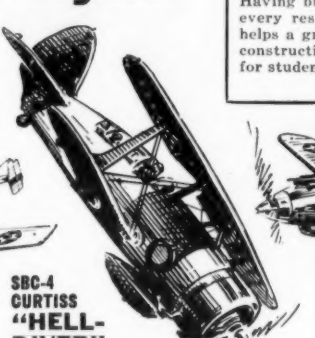


NORTH AMERICAN P-51 "APACHE"

Called "Mustang" by the British as it is a top vicious fighter. Employed by the Army as the P-51. Resembles the Messerschmitt ME-109. Span 27 3/16". C-D "Master" Kit SF-91..... **$3.00**

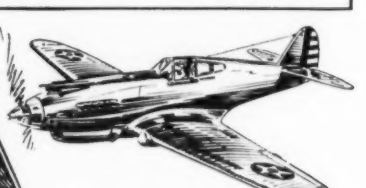
GRUMMAN "SKYROCKET"

Big 31½" scale job of the Navy's twin-motor 450 m.p.h. "Terror of the Skies." Fast flyer with both motors pulling. Master Kit SF-75..... **$3.50**



SBC-4 CURTISS "HELL-DIVER"

This famous SBC scout bomber can carry three heavy bombs and cruises far out over the ocean. This design made dive bombing "come of age." Span 25½". C-4 "Master Kit" SF-80..... **$3.50**



CURTISS P-40 "TOMAHAWK"

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BABY PLAYBOY Class A. For Atom motor or rubber powered. Biggest gas value on market. Span 33". Complete Kit GP-5008 (except motor unit) **$1.00**

LOCKHEED "HUDSON" BOMBER

Now widely used by the British Coastal Command, and by crack American and Allied pilots over the Pacific and in the Australian patrol. Beautiful 49⅜" model correctly and minutely detailed, with retractable landing gear and "full dress" of camouflage. Flies fast and furiously with its "full load of eggs"—a perfect miniature of the prototype. Master Kit SF-95 ..... **$7.50**

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Airplane prop. driven car model. Easily built Wood Super-structure, 60 m.p.h. Speed, Kit AU-7 (complete except power unit and color) **$5.50**

REPUBLIC P-47 "THUNDERBOLT"

A high altitude Army fighter that is a veritable battleship in both flying weight and fire power. A "must" model for all. Span 30¾". C-D Master Kit SF-81 ..... **$4.00**

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Doing great work in the Pacific for both the U.S. Navy as a shipboard fighter and for the Marine Corps. Span 27⅝". C-D "Master" Kit SF-83 ..... **$3.00**

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Also known as "Peanut Special." Span 26⅛". C-D "Master" Kit SF-87 ..... **$3.00**

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High speed performance from this model of the deadly "cannon plane." Span 25½". Master Kit SF-76 ..... **$3.00**

OF URGENT IMPORTANCE

To the serious enthusiast, we recommend that if any of these models are desirable for his collection that he purchase them immediately, and keep them on hand to be built as he finds time—for we cannot guarantee how long we will be able to continue all these numbers.

Super-detailed "Supercharged" Lockheed P-38 "LIGHTNING"

The world's fastest fighter, and C-D engineers have gone the limit in making this model as "terrific" as the prototype. Loads of detail! Big 38⅜" span. Super-powered twin-motor job that's speedy and realistic. An absolute "must" among model builders who want the newest and best. Master Kit SF-85 ..... **$4.00**

Douglas SBD-3 "Dauntless"

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(lists the 10 new models)— many others. Supplies too.

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GLIDERS FOR WAR!

Sovfoto

Acme

(Top) Three gliders towed by a plane at the U. S. Marine Corps glide school, Parris Island, S. C.—training for new type of warfare. (Left) In Russia, gliders are used to haul freight. This shows eleven gliders with their tow plane, giving some idea of glider possibilities.

by

CAPT. H. O. JOHANSEN
Headquarters, AAF

How the Army is solving the problem of rapid troop transport

JUST a year ago at Elmira, N. Y., Lieut. General Henry H. Arnold promised the nation that the Army Air Forces would have a glider force second to none.

A recent tour to centers of glider activity throughout the country shows that General Arnold's promise is being kept. The war-going glider is here. War-going glider pilots have been trained and are ready for action.

The "Commandos of the Air" are no longer a promise but a reality.

Everywhere one finds a serious and enthusiastic acceptance of the glider as a military weapon and the glider pilot as a spearhead in mass air assaults on the enemy.

A little more than a year ago no one took gliding seriously in this country, except the few sportsmen who enjoyed the thrills of thermal and ridge soaring. Now the factories that were then turning out a few small and impractical sailplanes are engaged in mass production of huge and business-like troop-carrying gliders.

Today the glider is as much a part of our war plans as the Flying Fortress.

The reason for the glider's coming of age is simple and obvious. Perhaps it was too obvious, for it embodies a principle man has been using since the beginning of transportation: You can pull more than you can

lift. The tug with its string of barges, the locomotive and its train of freight and passenger cars, and more recently, the automobile or truck and its trailer are all examples of the economy and increased efficiency of towing. Its adaptation to air transport was a long time coming but now is here in a big way.

It is a startling fact that by towing a single glider, a cargo airplane can double its load with the loss of only about 12 per cent in efficiency. With a tow of two and three gliders, the advantage is naturally that much greater. Colonel David M. Schlatter, Director of Ground-Air support, of the Army Air Forces, furnishes this excellent example:

"It has been calculated," explains Colonel Schlatter, "that a single DC-3 transport plane flying the route of the Burma road can carry in a month the same amount of equipment that could be handled by 56 trucks. If you double the carrying load of the transport by having it tow a glider, you are doing the work of 112 trucks. Then instead of using one transport and glider team, have many. You can readily see what this means in the transport picture all over the world."

Going further, Colonel Schlatter predicts the day when single airplanes are an oddity, when planes with trailing baggage and passenger "cars" are common.

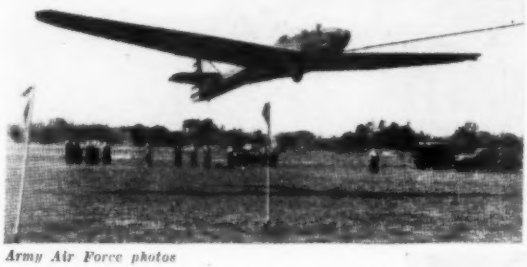
Limitless Possibilities

Our whole thinking on the subject of

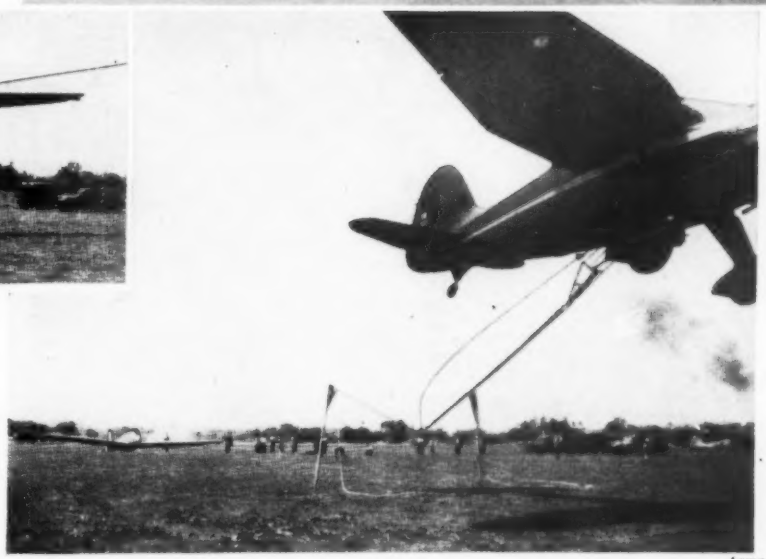
(Continued on page 63)

U. S. troops climb aboard one of the latest type nine passenger gliders. (Below) First all plywood-plastic Army glider comes in for landing; a prototype of giant cargo gliders.

Acme



Army Air Force photos



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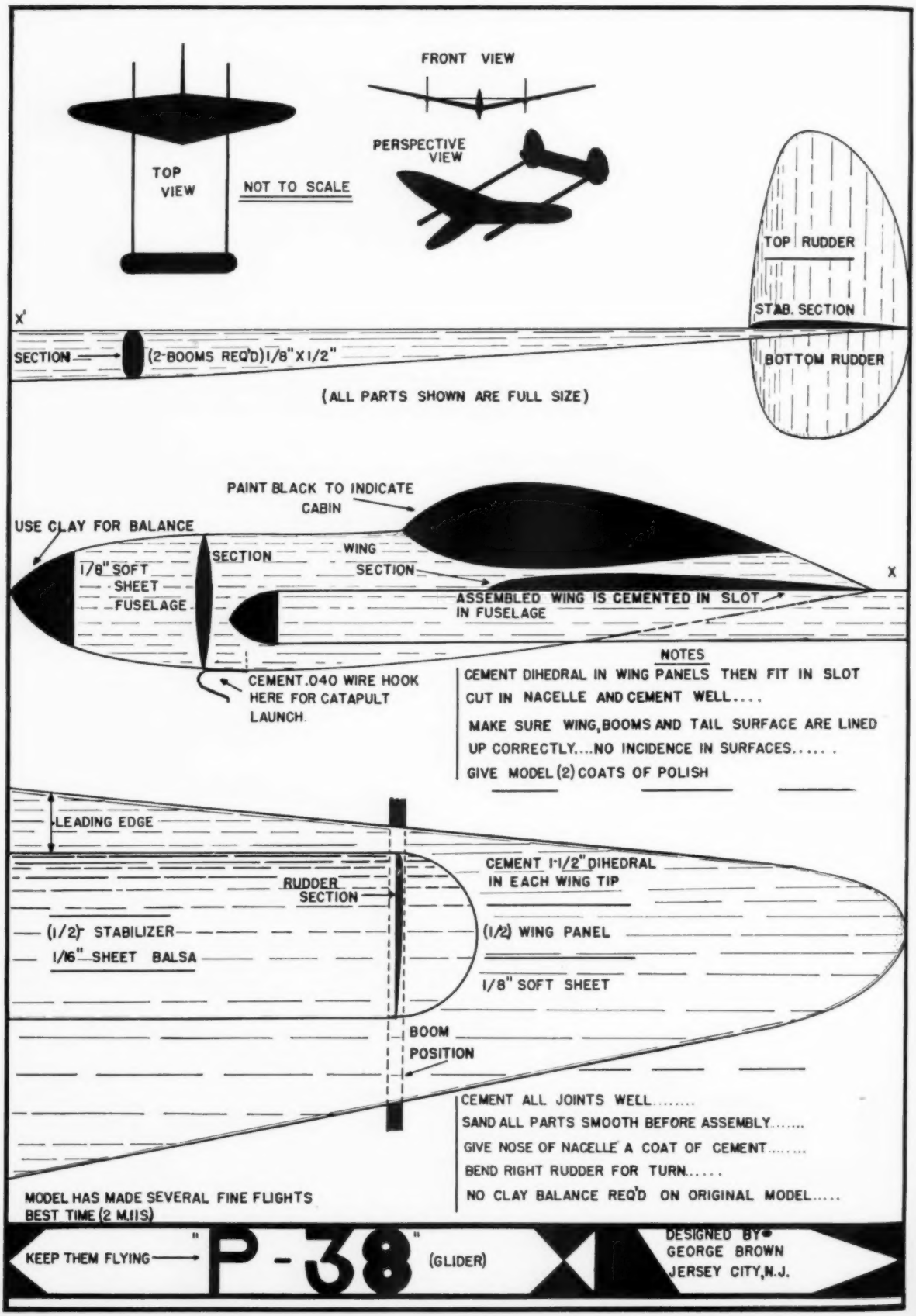
(Right) While in flight a tow plane, with automatic pickup device, hooks on to the tow line and glider with its extended grappling hook. (Above) Glider being towed into flight after a full flight hook on by the tow plane. (Below) A 450 h.p. tow plane and glider take off from a Texas highway on a cross-country flight. (Below right) Jeeps are used at Air Force fledgling school to tow gliders on training flights; to land, the tow line is released.


FRONT VIEW
PERSPECTIVE VIEW
TOP VIEW
NOT TO SCALE
TOP RUDDER
STAB. SECTION
BOTTOM RUDDER
X'
SECTION
(2-BOOMS REQ'D) 1/8" X 1/2"
(ALL PARTS SHOWN ARE FULL SIZE)
PAINT BLACK TO INDICATE CABIN
USE CLAY FOR BALANCE
1/8" SOFT SHEET FUSELAGE
SECTION
WING SECTION
X
ASSEMBLED WING IS CEMENTED IN SLOT IN FUSELAGE
CEMENT .040 WIRE HOOK HERE FOR CATAPULT LAUNCH
NOTES
CEMENT DIHEDRAL IN WING PANELS THEN FIT IN SLOT CUT IN NACELLE AND CEMENT WELL....
MAKE SURE WING, BOOMS AND TAIL SURFACE ARE LINED UP CORRECTLY....NO INCIDENCE IN SURFACES.....
GIVE MODEL (2) COATS OF POLISH
LEADING EDGE
RUDDER SECTION
(1/2) STABILIZER
1/16" SHEET BALSA
CEMENT 1-1/2" DIHEDRAL IN EACH WING TIP
(1/2) WING PANEL
1/8" SOFT SHEET
BOOM POSITION
CEMENT ALL JOINTS WELL.....
SAND ALL PARTS SMOOTH BEFORE ASSEMBLY.....
GIVE NOSE OF NACELLE A COAT OF CEMENT.....
BEND RIGHT RUDDER FOR TURN.....
NO CLAY BALANCE REQ'D ON ORIGINAL MODEL.....
MODEL HAS MADE SEVERAL FINE FLIGHTS
BEST TIME (2 M.11S.)
KEEP THEM FLYING
P-38
(GLIDER)
DESIGNED BY
GEORGE BROWN
JERSEY CITY, N.J.

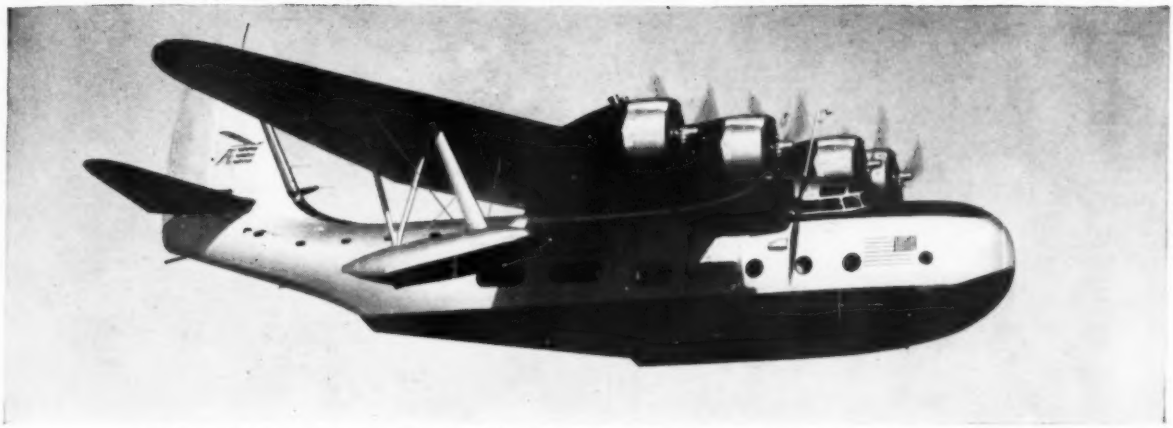


Fig. 23. The giant Vought-Sikorsky flying boat "Excalibur" for long range trans-ocean transport.

MODELING YOUR FUTURE IN AVIATION

Official Air Youth course in elementary aeronautics

by CHARLES H. GRANT

Article 4

Types of Planes and how Their Task Determines Their Design

ALL airplanes are basically like the bird—having wings for lift; tail surfaces (in tailless planes their equivalent) as well as proper arrangement of surfaces and weights for stability; a landing gear; movable surfaces such as ailerons, elevators and rudders for control; and body structure to hold all of these units together properly.

Why, then, are there so many different structural types of planes? Some are small, some large; there are monoplanes, Fig. 20; biplanes, Fig. 21; triplanes, high-wing planes, Fig. 22; low-wing and others, all of different form and contour.

Contrary to average conception, the structural form of a plane is not the result of fancy or arbitrary design. In fact every proportion, line and curve is dictated by engineering or economic considerations. An airplane is built with certain proportions only because the designer believes that a plane with these proportions will fulfill a particular purpose most efficiently. Therefore because planes serve many purposes, and conceptions of various designers differ, hundreds of different types result.

There are several basic considerations that influence plane design. The first is performance—of primary importance in war craft. High performance is essential for combat regardless of cost or complication involved in attaining it. Not only is high performance required of each plane but usually the form and structure is designed for a specific type of performance required to accomplish its special mission.

Performance is measured by speed, rate of climb, maneuverability, maximum altitude or ceiling, useful load, diving speed, non-stop flight range, takeoff and landing speeds. To fulfill one purpose, speed and high rate of climb may be essential; for another, ability to carry a heavy load of bombs a long distance. The same airplane cannot give maximum performance for all purposes. For rapid climb and speed, a light, high powered plane is necessary; too light to carry a heavy load of bombs and fuel for a long range flight.

Secondly, the design of a plane also depends on where and how it is to be used. If it is to operate from land or from a carrier deck it is equipped with wheels; if from

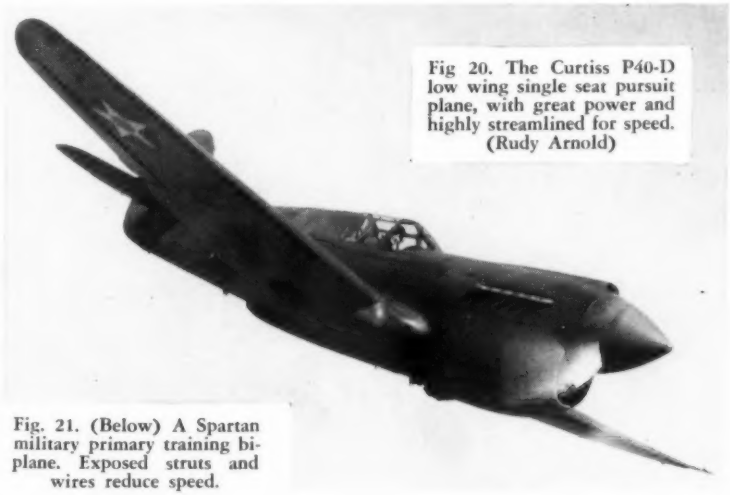


Fig 20. The Curtiss P40-D low wing single seat pursuit plane, with great power and highly streamlined for speed. (Rudy Arnold)

Fig. 21. (Below) A Spartan military primary training biplane. Exposed struts and wires reduce speed.

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Grumman "Wildcat"

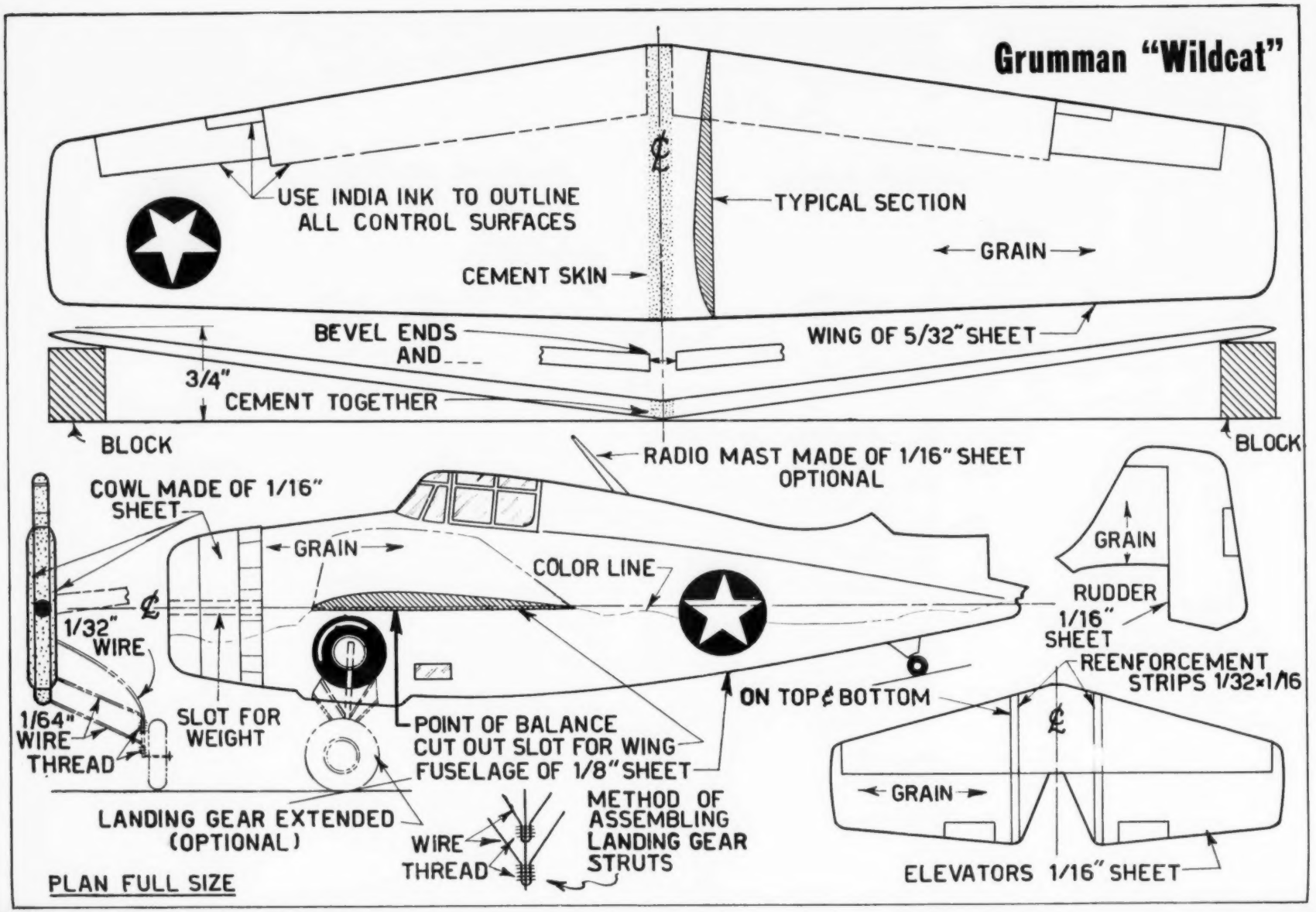


Fig. 25. (Right below) The Grumman "Wildcat," mid-wing single seat Carrier Pursuit Fighter. Fig. 26. (Right) The Curtiss 21-B Interceptor-Fighter. With high power and of little weight it climbs more than a mile a minute vertically.

water, the body is constructed to serve as a boat as well as a fuselage to house crew and equipment, Fig. 23. Small water planes are equipped with light floats for ease in handling instead of a cumbersome fuselage hull, Fig. 24. Planes operating from land and water are called amphibians, having both a boat-like body and wheels. The latter can be raised when operating from water or lowered for use on land.

Whether a plane is for war or commerce has a bearing upon its equipment and consequently upon its design.

The third influencing factor is cost of production. In light sportplanes, Fig. 22, price and economy of operation, not primarily performance, are most important. Here complicated shapes and refinements of structure necessary to high performance must be sacrificed in favor of simpler, cheaper construction with less aerodynamic efficiency. Planes with square corners and straight lines are always cheaper to build but give lower performance.

The final and less tangible factor is the preferences of the designer whose ideas are the product of his knowledge and experience which vary with the individual.

So to carry out efficiently various tasks in war or commerce many different types of planes are used, each having special combinations of these performances and economic characteristics.

Plane types are more or less standardized according to their tasks, as follows:

1. Pursuit (offensive fighters)
2. Interceptors (defensive fighters)
3. Light Bombers and Ground Strafers
4. Heavy Bombers
5. Transports (military or commercial)
6. Reconnaissance (scouting and observation)
7. Liaison (communication and coordination)
8. Heavy Sportplane } (training, individual transportation and pleasure)
9. Light Sportplane }

Pursuit Fighter

On the offensive the purpose of the pursuit is to escort bombers and ward off attacks. On the defensive it attacks the enemy bombers, eliminating if possible the protective screen of enemy fighters. It is chiefly a combat ship designed to destroy other airplanes, though occasionally they are used for ground strafing.

These required functions determine the type of design. This plane must be swift, climb fast, include great fire power, and above all must be highly maneuverable. Victory or defeat depends upon these qualities, because unless it is possible to outspeed, outclimb and outmaneuver the enemy, the pilot is at a disadvantage.

The design of a pursuit plane hinges around these specific performance characteristics. The structure must be formed to give

Fig. 27. (Below) The famous Lockheed P-38, twin engine Interceptor Fighter. Fig. 28A. (2nd below) Douglas DB7-A light bomber and attack plane warms up its engines for a flight: wing is above the center line of the fuselage.

Fig. 22. A Taylor Cub J-2 sport-plane. Note the light economical construction.

greatest speed, climb and maneuverability. Let us see how this is done.

First—for high speed there must be high power and low drag (resistance). This relationship is a basic measure of speed in airplanes. The pursuit plane therefore is practically a streamlined engine with only enough structure to provide: required wing area; a fuselage long enough for minimum stability; and only sufficient bulk to enclose the pilot with minimum equipment. Every contour is highly streamlined to reduce resistance of the scanty structure.

Second—the plane must have great power and large wing area *compared to total weight*. Fundamentally, this determines the climb.

Obviously a light airplane climbs faster than a heavier one with given power, for the same reason that a light automobile climbs a steep hill faster than a heavy one with equal power. So great care is taken to build the structure as light as possible, and to eliminate all equipment not absolutely essential for destroying the enemy, protecting the pilot, for navigation and required flight range.

Usually the fuselage is no longer than necessary to provide minimum stability, thereby reducing weight to lowest terms. The wings are made as small as possible without reducing lift to the point where takeoff and landing speeds are too high, or where it lowers the required rate of climb and ceiling. This demands care in selecting a wing crossection. Large wing areas give greater climb, therefore wing weight should be reduced only in ways not requiring reduction of area and loss of lift.

Third—a pursuit must be very maneuverable to bring the enemy readily within the fire of its guns and to avoid his return fire. This requires sufficient wing area to make sharp turns and twists possible at reduced speed, because planes with small wing area traveling at very high speed require more time and space to execute a given maneuver.

Paradoxically, though large wing area makes a plane maneuverable it reduces the high speed so essential in this type of plane; so designers compromise by making the wings large enough for climbing and maneuvering yet small enough for speed. Where the line should be drawn depends upon the judgment of the individual designer.

The wings also should be of large span compared to the fuselage length. Thus, when the ailerons are operated, large rolling moments result, making possible sudden rolls.

It is advisable to make pursuit ships as short as possible because large weights far from the center of the airplane tend to slow down reactions to the rudder and elevator. The control surfaces located on the tail are used to turn the plane right or left and to climb or dive.

Fourth—firepower is proportional to the caliber and number of guns carried. Here

(Continued on page 54)

Fig. 24. The Beechcraft B-17, high powered twin float hydro sport biplane.

Fig. 28B. Douglas DB7-A light bombers. They carry a medium load of bombs at high speed.

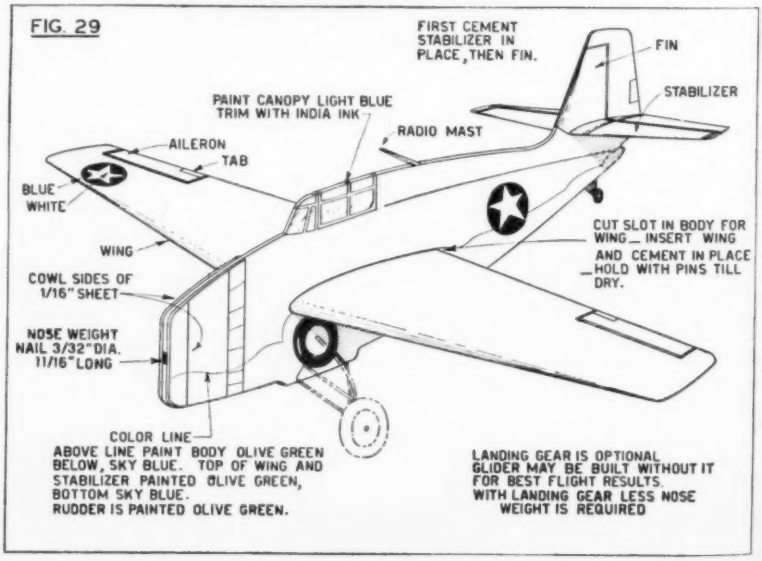
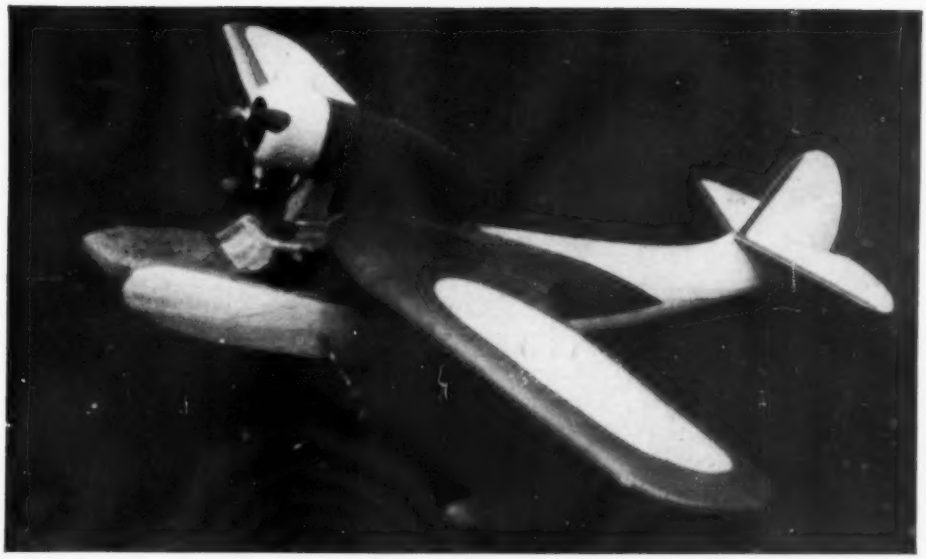


FIG. 29
FIRST CEMENT STABILIZER IN PLACE, THEN FIN.
FIN
STABILIZER
PAINT CANOPY LIGHT BLUE TRIM WITH INDIA INK
RADIO MAST
AILERON
TAB
BLUE
WHITE
WING
CUT SLOT IN BODY FOR WING— INSERT WING AND CEMENT IN PLACE —HOLD WITH PINS TILL DRY.
COWL SIDES OF 1/16" SHEET
NOSE WEIGHT NAIL 3/32" DIA. 11/16" LONG
COLOR LINE
ABOVE LINE PAINT BODY OLIVE GREEN BELOW, SKY BLUE. TOP OF WING AND STABILIZER PAINTED OLIVE GREEN, BOTTOM SKY BLUE. RUDDER IS PAINTED OLIVE GREEN.
LANDING GEAR IS OPTIONAL GLIDER MAY BE BUILT WITHOUT IT FOR BEST FLIGHT RESULTS. WITH LANDING GEAR LESS NOSE WEIGHT IS REQUIRED



MODEL AMPHIBIAN SPORTSMAN

Complete data for building a detailed flying miniature of the Fairchild Amphibian—it operates from land or water

by MORRIS MOUNTJOY

THE time is soon coming when flying scale gas models will form the most interesting event of every contest. Then only will the element of luck be cut to a minimum and the builder of the best model be given an opportunity to combine craftsmanship with flying skill to win a prize which he rightfully deserves.

This amphibian model represents a development in design, not in the proportions or appearance of the model but in the method of construction. Due to the shape of the fuselage and location of the motor nascelle the usual method of building a square frame and applying bulkhead formers seemed as impossible as it did impractical.

After giving the subject a great deal of thought it was decided to use solid bulkheads held in position by five main-spars. The several advantages connected with this type of construction include: no full size lay-out need be drawn, no tacking down of parts is necessary, and perfect alignment of the fuselage is assured.

Next came the problem of a landing gear and tail wheel that would be strong enough to hold the added weight of a scale model in addition to being waterproof. No attempt was made to make the gear retract, instead it is easily removed and quickly attached. The tubing mount for the landing gear is flush with each side of the hull and runs the entire width. Any water going in one end will pour out the other without entering the cabin. Tubing for the tail wheel mount is pinched tight at the top end to make it waterproof.

The tubing and steel wire method has proven satisfactory in holding the wing in place and also in mounting the auxiliary floats. Full adjustments on the floats are possible in any direction.

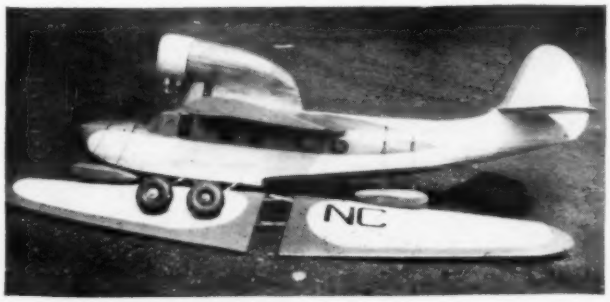
Because of the motor location, an extra large pontoon area, and the addition of wing floats, nose-overs and other average seaplane mishaps are rare. You fellows who have tried to hand-launch a gas model from a boat will appreciate this advantage. Under such conditions nothing short of a miracle will get the model in flight, unless, of course, the boat is under power and heading into the wind.

CONSTRUCTION

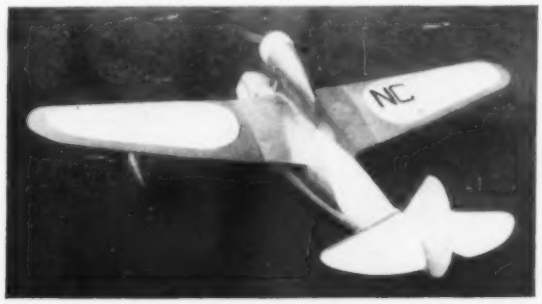
In building the Fairchild Amphibian the fuselage is the first step. Cut the nine full sized bulkheads as shown on Plate Two from medium grade 1/8" sheet balsa.

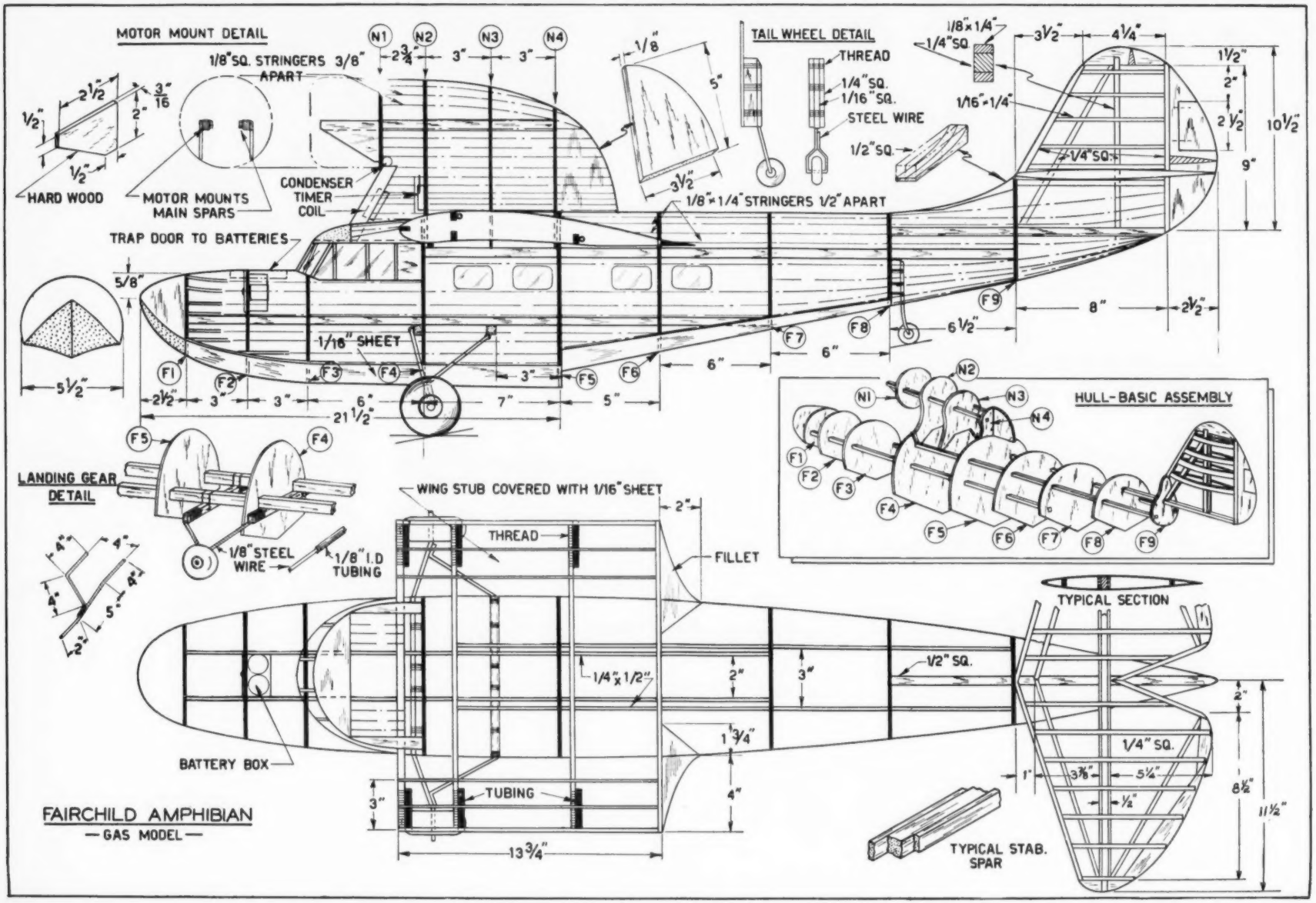
(Continued on page 48)

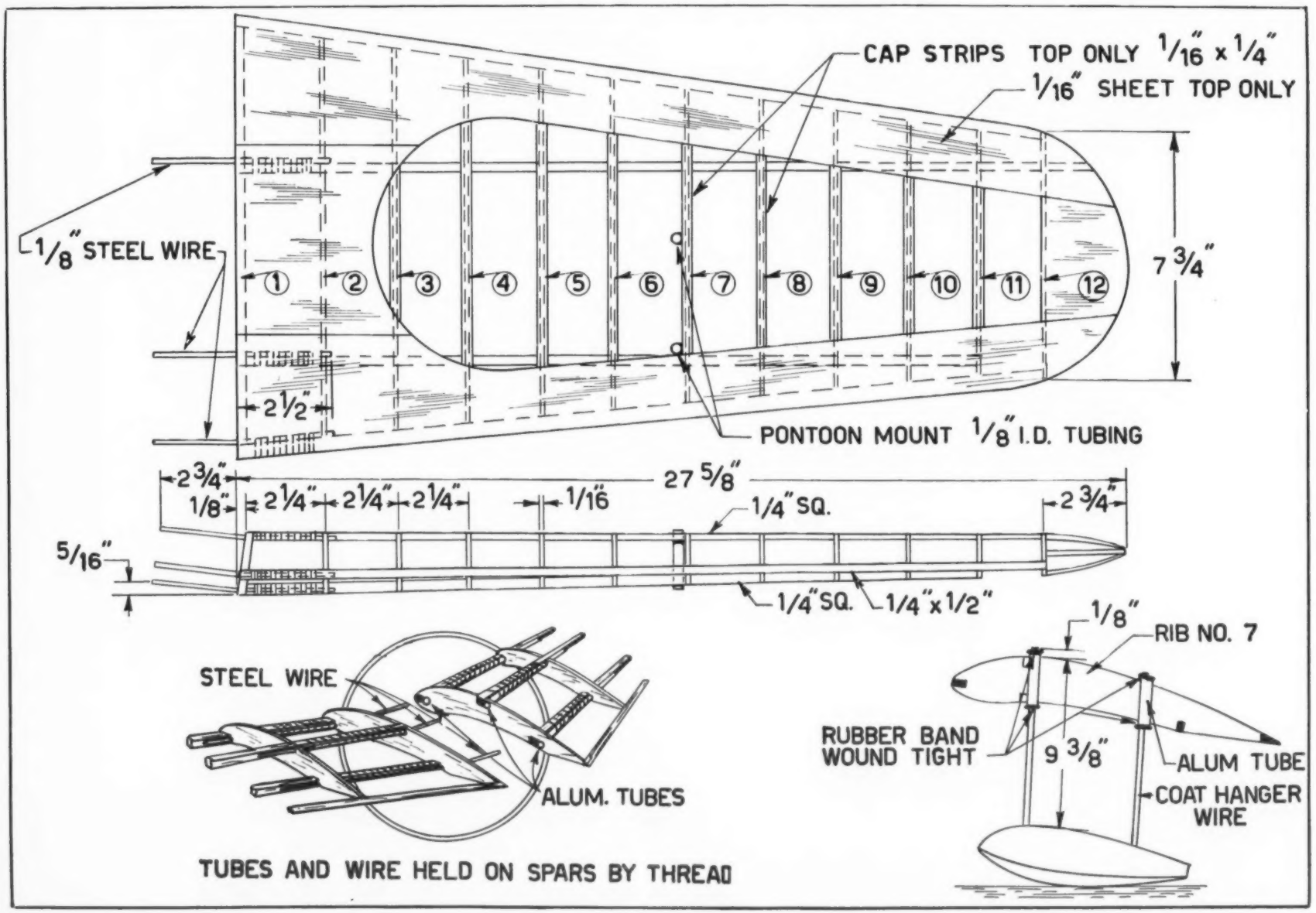
Wings, floats and wheels can be demounted for easy transportation



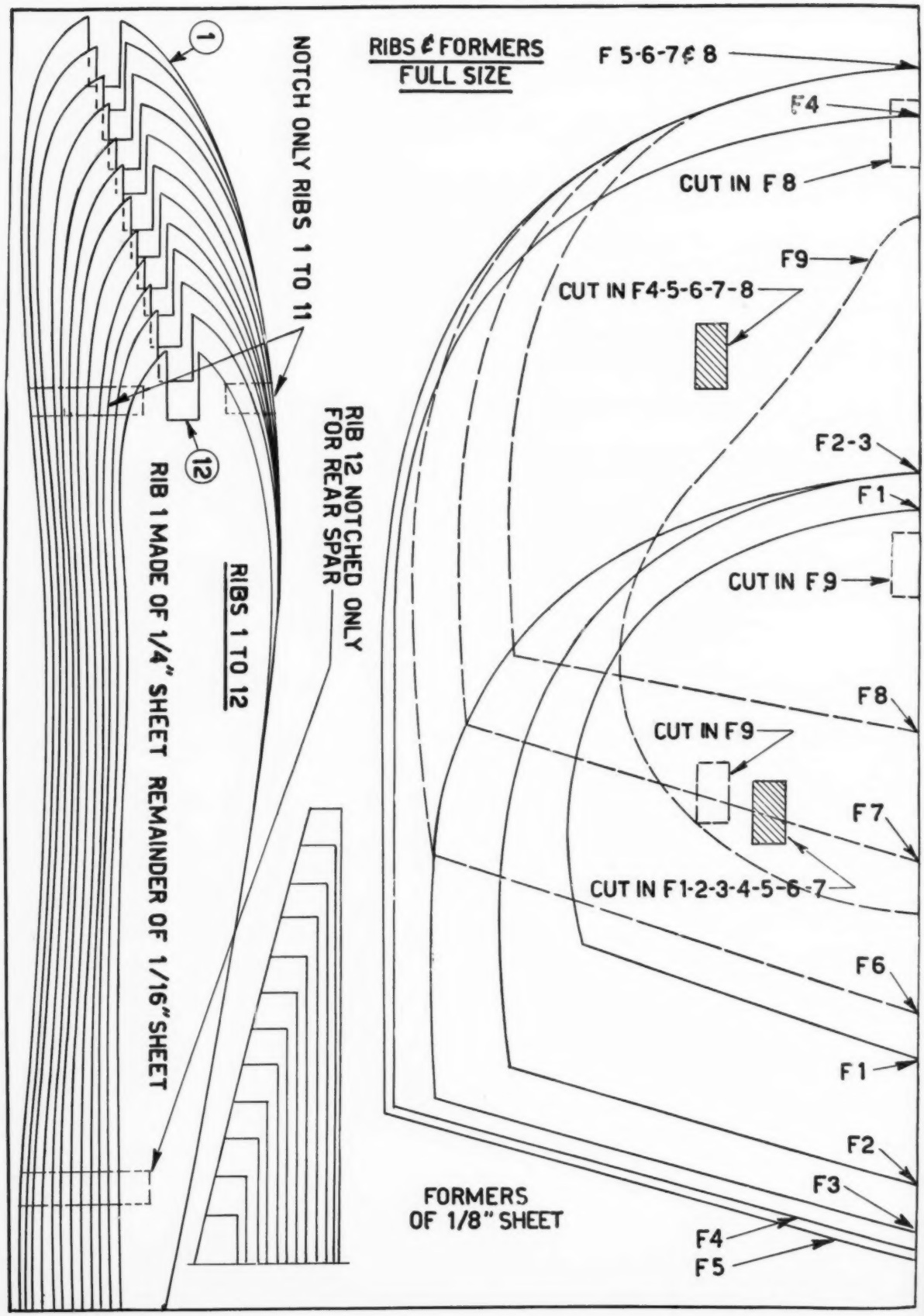
With all the grace and realism of the full scale ship it performs perfectly from land or water

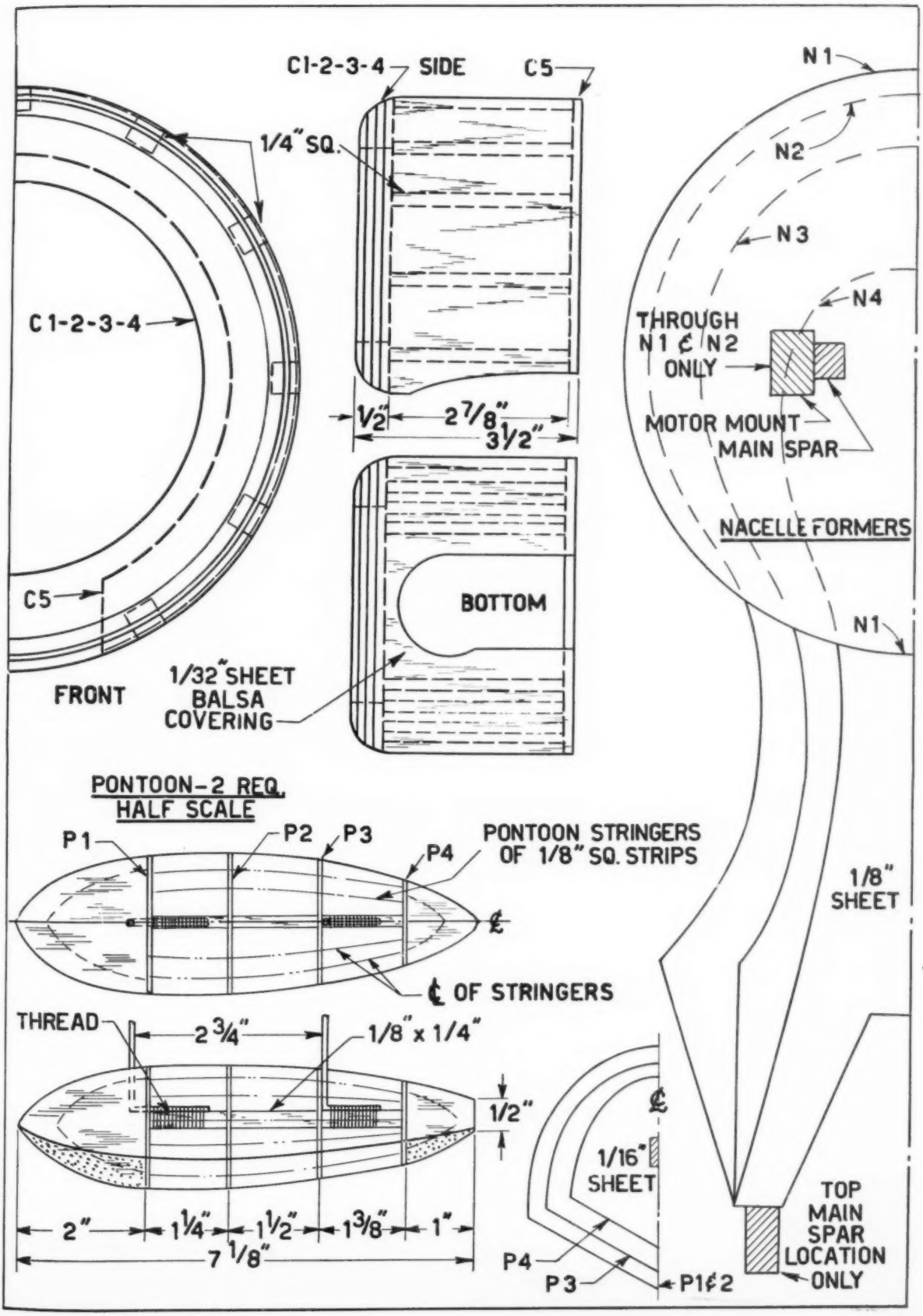



MOTOR MOUNT DETAIL
1/8"SQ. STRINGERS 3/8" APART
HARD WOOD
MOTOR MOUNTS MAIN SPARS
CONDENSER TIMER COIL
TRAP DOOR TO BATTERIES
1/16" SHEET
TAIL WHEEL DETAIL
THREAD
1/4"SQ.
1/16"SQ.
STEEL WIRE
1/8"x1/4" STRINGERS 1/2" APART
1/8"x1/4"
1/4"SQ
1/16"x1/4"
1/2"SQ
1/4"SQ.
HULL-BASIC ASSEMBLY
LANDING GEAR DETAIL
1/8" STEEL WIRE
1/8" I.D TUBING
WING STUB COVERED WITH 1/16" SHEET
THREAD
FILLET
1/4"x1/2"
BATTERY BOX
TUBING
TYPICAL SECTION
1/2" SQ.
1/4" SQ.
TYPICAL STAB. SPAR
FAIRCHILD AMPHIBIAN
— GAS MODEL —



TUBES AND WIRE HELD ON SPARS BY THREAD


RIBS & FORMERS
FULL SIZE
F 5-6-7 & 8
F4
CUT IN F 8
F9
CUT IN F4-5-6-7-8
F2-3
F1
CUT IN F 9
F8
CUT IN F9
F7
CUT IN F1-2-3-4-5-6-7
F6
F1
F2
F3
F4
F5
FORMERS
OF 1/8" SHEET
1
NOTCH ONLY RIBS 1 TO 11
12
RIB 12 NOTCHED ONLY
FOR REAR SPAR
RIB 1 MADE OF 1/4" SHEET REMAINDER OF 1/16" SHEET
RIBS 1 TO 12


C1-2-3-4
SIDE
C5
1/4" SQ.
C1-2-3-4
C5
FRONT
1/32" SHEET BALSA COVERING
1/2"
2 7/8"
3 1/2"
BOTTOM
N1
N2
N3
N4
THROUGH N1 & N2 ONLY
MOTOR MOUNT
MAIN SPAR
NACELLE FORMERS
N1
PONTOON-2 REQ.
HALF SCALE
P1
P2
P3
P4
PONTOON STRINGERS OF 1/8" SQ. STRIPS
℄ OF STRINGERS
THREAD
2 3/4"
1/8" x 1/4"
1/2"
2"
1 1/4"
1 1/2"
1 3/8"
1"
7 1/8"
1/16" SHEET
P4
P3
P1 & 2
1/8" SHEET
TOP MAIN SPAR LOCATION ONLY

FRONTIERS

Planes that are making world history

1. The Martin Mariner PBM-3, new long range flying boat credited with great firepower and bombing capacity

ONE of the latest additions to the armed forces is the Martin Mariner, PBM-3 flying boat, shown in picture 1. Ships of this type are of the greatest importance because of the extended nature of present day warfare. Fighting is not confined alone to the land or to water, but is often of an amphibious nature.

The Martin Company built some of the first trans-Pacific Clipper ships and consequently has gained great experience in producing this type of craft. It is used to patrol our extensive coast lines and to scout the enemy; a combination of scout, fighter and bomber. Long thin wings give high efficiency for long range flights, making it excellent for the purpose and in addition it is reputed to carry a very heavy bomb-load to be dropped upon attacking submarines or other objectives. It is heavily armed with machine guns and has great fire power from guns placed at convenient points throughout. Ships of this type have shown that they can defend themselves successfully against the attack of several pursuit ships.

One of its interesting features is the gull wings which raise the motors and propellers well above the spar when taking off and landing, an important advantage because water damages the tips of propellers turning at high speed. These cowl arrangements also allow improved visibility and increase aerodynamic efficiency. In the picture, note that wing trailing edge flaps are partially depressed. Usually these flaps are depressed part-way for takeoff (approximately 30 degrees) and fully (60 degrees) for landing. They have the effect of increasing the lift of the wings tremendously, allowing the ship to take off and land at a slower speed than usual.

Upturned fins are used with a dihedralled stabilizer; that is, the two halves are turned upward from the rear of the fuselage. This not only gives greater flight steadiness but raises the fins free of the water. No detailed data can be given but it is assumed that the powerplants are the new 2000 hp. engines, giving the ship a total power of 4000 hp., and probably a range of 3000 miles or more.

2. Test model of the North American Aviation P-51 Mustang in the wind tunnel. (Acme)

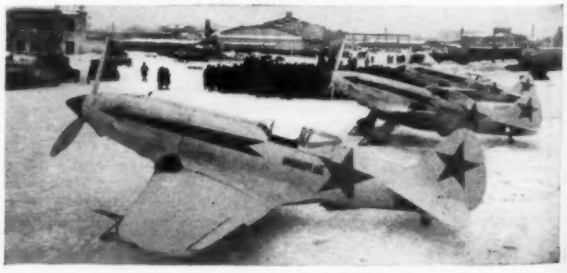
3. A plane without propeller, the Caproni-Campini C.C.2, that flew 168 miles in 2½ hours by jet propulsion (rocket). (British Comb.)

In the past most not familiar with aeronautics have looked upon models as only "playthings." Picture 2 explodes this misconception, for here you see an exact scale

(Continued on page 40)

5. These Russian I-26 (L999-3) single seat fighters carry two cannons and two machine guns. (Sovfoto)

4. 370 mph Russian M16-3 fighters presented by factory workers to the Red Army. (Sovfoto)



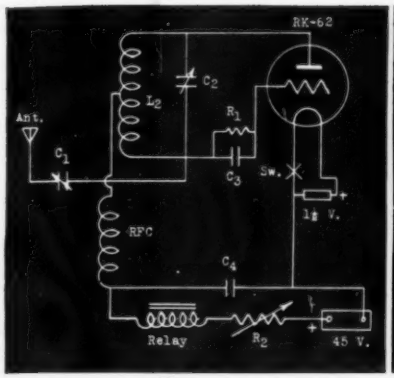


Fig. 1

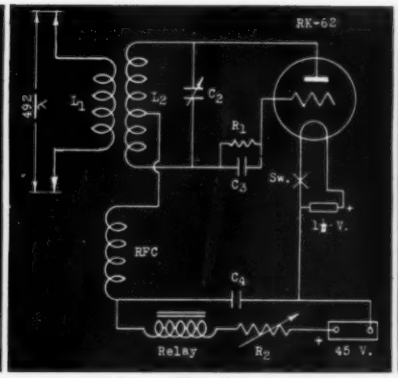


Fig. 2

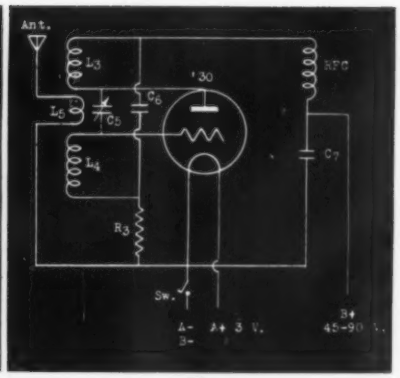


Fig. 3

"AIR CONDITION" YOUR RADIO CONTROL

How to build your radio control installation to give reliable service and facilitate repair

by JAMES R. *and* THOMAS G. CUSTIN

MUCH has been published in the last three years on the subject of radio control devices. Several kinds of mechanisms have been described and explicit instructions for building a radio control are now easy to find. Unfortunately, however, writers on the subject seem to assume that the controls they describe will operate perfectly as soon as they are put into the airplane, and very little has been said about the troubles which may arise to bedevil the experimenter. Nor has anyone undertaken to indicate the pitfalls which await the pioneer who sets out to design his own equipment.

Four years' experience has shown us that there is as much to be said about what *not to do* in the field of radio control as there is about what *to do*. We hope, therefore, that the hints and suggestions set forth here will be of some value in enabling experimenters to waste less time in finding out what is wrong and permitting them to spend more time in advancing the art.

In radio control work, as in everything else, the best way to eliminate trouble is to prevent it. That's why we'd like to start with a few practical suggestions on the construction of the radio control unit.

Let's begin by considering the problem of weight. Obviously, the control unit to be carried in the plane ought to weigh as little as possible, but how much should be sacrificed for lightness? We feel that cutting corners too much is not a good idea, and that dependability ought to be the first consideration.

For example, removing the tube base and eliminating the socket cuts the weight by only half an ounce, while there is about a quarter of an ounce additional weight added by the baseless mounting. The net gain of a quarter of an ounce hardly compensates for the additional troubles encountered in removing the tube on the field. If the tube has a tendency to come out of the socket under vibration, tiny drops of solder at the bottom of the tube prongs will hold it in and still permit quick removal when necessary.

Another weight saving device which usually proves futile is that of drilling holes in parts in order to cut down the mass of material. This applies to the airplane as well as the control unit. We recall the time that we laboriously cut seven holes in each rib of a large wing. The ribs were made of 1/8" sheet balsa, and the holes were about 3/4" in diameter. We saved all the little disks that we had cut out of the fifty-odd ribs and weighed them to see how much we had gained for our pains. It amounted to less than an eighth of an ounce!

Another element to which weight might well be given a subordinate place is accessibility. Our experience has shown that a device may look perfect on paper, may function flawlessly on the bench—may even work all right for the other guy—but the time will come when it will have to be serviced. And particularly when it has to be serviced on the field is get-at-ability important. If at all possible, the entire control should be built in one unit, removable from the airplane without the necessity of unsoldering wires.

A sturdy framework of 1/4" square hard balsa should hold the entire equipment, including batteries. This unit should be insulated from the airplane frame with sponge rubber in order to damp vibration, and the individual components should be rigidly mounted to the unit. Antenna wires and control wires or cables should clip to terminals at convenient points on the unit chassis. We have found it very handy to have the unit slip into the fuselage just under the wing, so that the center section covers the opening, thus eliminating the need for an excessive number of hatches.

If the necessities of the design make this type of unit construction impracticable, the control components should be grouped as closely together as possible, so as to make them accessible through the least number of hatches. Concentrated grouping of control components also has the advantage of concentrating weights at the center of gravity, a factor which makes for improved dynamic stability of the airplane itself.

When mounting the control components, remember that there are two types of punishment which they will have to take—stresses due to hard landings (and you can figure that *every* landing will be a hard landing), and vibration. Landing stresses are pretty much a problem of airplane construction. While we're on the subject, we might remark that the airplane ought to be designed around the control, and that the usual method of building the airplane and then sticking a control into it leads to unsatisfactory results.

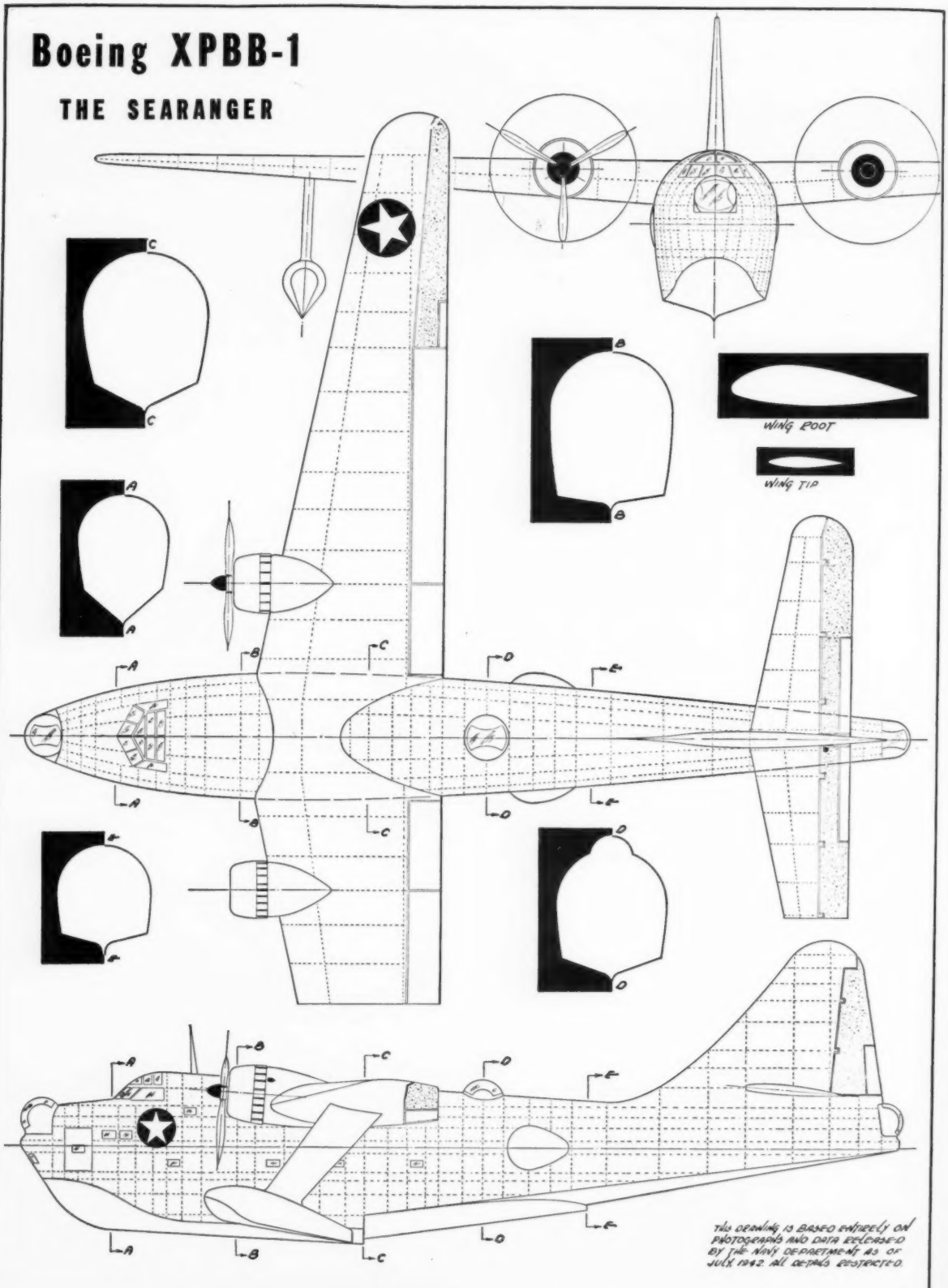
There is no formula for solving the vibration problem, but a few tips on what to expect might not be amiss. We'd like to repeat what we said above: that all of the components ought to be mounted rigidly to the control unit chassis, and that the chassis itself ought to float on shock-proof mountings. These can be made of sponge rubber faced with smooth paper to facilitate sliding the unit into and out of the ship. Letting the parts vibrate individually may lead to trouble. We once mounted a condenser rigidly and a socket on sponge rubber and connected them with a piece of No. 16 bus-bar wire. After a time—believe it or not—the wire was sheared by vibration!

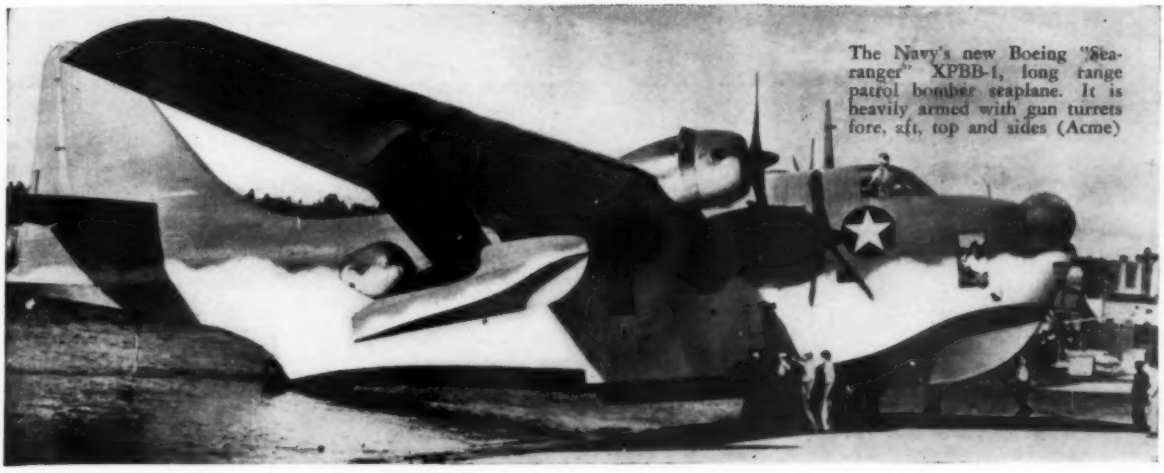
There is another lesson in this experience. Single strand wire has a nasty habit of breaking under vibration. A.C.-D.C. aerial wire, the kind used in midget sets, is flexible stranded wire very suitable for control hookups and ignition wiring. It's a good idea to put a drop of cement at each end of the cloth insulation on the wire, cementing it to the solder joint and

(Continued on page 42)

Boeing XPBB-1

THE SEARANGER


WING ROOT
WING TIP
THIS DRAWING IS BASED ENTIRELY ON PHOTOGRAPHS AND DATA RELEASED BY THE NAVY DEPARTMENT AS OF JULY 1942. ALL DETAILS RESTRICTED.



The Navy's new Boeing "Searanger" XPBB-1, long range patrol bomber seaplane. It is heavily armed with gun turrets fore, aft, top and sides (Acme)

THE SEARANGER

The plane on the cover

IN THE April, 1942 issue of MODEL AIRPLANE NEWS we gave you a brief history of the development of the famed Boeing Flying Fortress, the most outstanding long-range heavy bombardment type airplane now in use throughout the world. However, oddly enough, Boeing has always been primarily a seaplane manufacturer and the interests of the engineers of the vast Seattle, Washington, firm have, for many years, slanted towards flying ships of the sea. As a matter of fact the very first Boeing airplane, the B-1, was a flying boat and this small biplane hung up a record total of 350,000 miles of flying in seven years of operation wearing out six different engines in the process. Other Boeing seaplane designs followed, including a Navy training plane and several large flying boats built under license from the Naval Aircraft Factory during the last war.

Two experimental flying boats were built during the twenties and in 1935 work was begun on the largest airplane ever undertaken in the United States, a giant four-engined flying boat.

By 1938 the first Boeing Model 314 "Clipper" type had taken the air and during the first six months of 1939 Boeing delivered all six of its fleet of transoceanic flying boats to Pan American Airways for its Atlantic and Pacific routes. The ship was an instantaneous success and it has hung up many enviable records for speed, distance and performance while in commercial service. The ships are now flying the flags of the United States and Great Britain in full war-time service and it is now doing its part towards the preservation of the air-lines for all who would use them, not just the Nazis!

When the call came for preliminary engineering design work on a Naval patrol-bomber Boeing was ready . . . and willing, and most assuredly able with the experience gained from a quarter-century of flying boat design. And the Sea Ranger, our Plane on the Cover this month, was the answer to this challenge.

Some of the requirements for this ship included a heavy bomb or torpedo load, adequate fuel load for an efficient cruising range and heavy defensive fire power for, with their great cruising range, these types cannot depend upon fighter convoys and, therefore, must go their way alone, completely unprotected except for their own guns.

The Boeing Sea Ranger is a twin-engine high-wing monoplane flying boat powered by two experimental double-row radial air-cooled engines of undisclosed horsepower. The hull is of a tapered profile, unique for this design, sloping aft in a rakish angle to the rudder. It is of all-metal construction with solid water-tight bulkheads making it possible to seal off damaged compartments and thus remain afloat or even take off again depending upon the extent of the damage.

The pilot's compartment is located high and well forward atop the hull and provides a good field of vision for submarine spotting. The compartment provides seats and controls for the pilot on the left side and the co-pilot on the right side. The engineering office is located immediately aft of the pilot compartment and contains the engine throttles, propeller and mixture controls and a vast array of engine instruments for the use of the flight engineer.

The navigator is located in this same compartment on the opposite side and is provided with a ladder and a special observation port through which to take his required readings.

Within the hull are the accommodations for the service crew as well as provisions for carrying sizable number of men, possibly sea-going commando troops to aid in a sea-borne attack against the enemy.

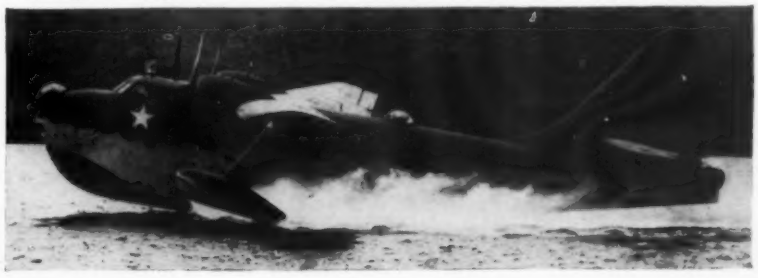
In the bow is the forward gun turret, a spherical transparent power operated type controlled by the nose gunner. It contains twin machine-guns and adequate ammunition to protect the forward sphere of defense of the airplane.

The upper turret is located just aft of the wing and is of a design similar to the nose turret, being a power-operated multi-gun type protecting the Sea Ranger from attack from above. Two side turrets of the famed Boeing "blister" type take care of any marauding Zero fighters attacking off either beam and a ball turret is located in the extreme aft end of the hull. Thus, the Sea Ranger's armament is formidable indeed and she can well take care of herself in any sky battle with marauding enemy planes—either Jap or Nazi.

The wing is divided into panels for ease of disassembly and assembly and it

(Continued on page 46)

"Searanger" taking off on a test flight resembles a huge water going dog (Acme)



AIR YOUTH

(A Division of the National Aeronautic Association)

Official Model Airplane News Prepared by R. W. Nichols

4-Year-Old Flies Model

THE idea of catching 'em young and training 'em fast is not new to the Badgley family of Bell, Calif.

Russell A. Badgley, an administrative leader member of the N.A.A. Academy of Model Aeronautics, admits that it is with much pride that he tells of his young son flying a model on his fourth birthday.

Mr. Badgley's original intention was to "unveil" this budding aeronautical engineer at the National modelplane meet scheduled for Chicago. With the cancellation of the contest, he gives us fair warning by means of photos that we can look to the Badgley "boys", father and son, for some pretty keen competition in the near future.

Mr. Badley poses a thought-provoking question: "Do you think our President would cut out all model (plane) building for the duration if he and his War Production Board could see a few sets of pictures like these? I think they would help make WPB, or the 'powers that be', realize how vital modeling is toward the advancement of aviation and our winning this war."

Military Leaders Turn Down Request for Aeromodeling Materials

According to authoritative reports, Army and Navy representatives have turned down requests from the model airplane industry for materials to continue the production of miniature airplane engines and related items. Military leaders acknowledge the part aeromodeling is playing in interesting millions of young Americans in aviation, but feel that any diversion of critical materials from the production lines is unwise at this time.

In conjunction with this, it is with interest that N.A.A. headquarters learned that Paul K. Guillow, a large manufacturer of modelplane kits is now using substitute materials for balsa which has become scarce because of ship shortages on South American routes.

"As you know," reports Mr. Guillow, "we have been one of the large users of balsa wood in the model airplane industry. We decided early in the year that we would attempt to make all of our gliders, flying and solid model construction kits of substitute materials.

"At the present writing we are well on our way. We have decided not to use any more balsa in our models or gliders other than the parts that we have in process at the moment. Since we have used several hundred thousand feet of balsa annually for a number of years, we hope that this will be a small contribution in aiding the war program for life rafts and the like.

"It has been quite a job to convert our machinery and equipment which was designed especially for balsa, to the domestic woods, but it can be done and we already have started shipping gliders and flying models made from substitute materials."

Air Youth Moves Too!

With the moving of N.A.A.'s Washington headquarters office to a new location, this is a reminder that the Air Youth address will be changed, too.

All mail should be addressed to the Air Youth Division or the Academy of Model Aeronautics, care of N.A.A., 1025 Connecticut Avenue, N.W. Washington, D. C.

Scholarship Committee Reviewing Entries

The judging committee in the Second Air Youth Scholarship Competition is now in the process of reviewing the entries which were submitted from all parts of the country. The general excellence of the material submitted and the qualifications of the candidates, as well as the high awards which await the winners combine to make the selection not an easy one.

The committee chairman, Maj. Lester D. Gardner, executive vice president of the Institute of the Aeronautical Sciences, promises that public announcement will be made as to the winners as soon as each judge has had ample opportunity to carefully pass upon each entry. More than $12,000 in scholarships to America's leading aviation schools await the fortunate winners.

Nichols Appointed Air Youth Director

Russell W. Nichols, of Silver Spring, Md., has been appointed Acting Director of the N.A.A. Air Youth division, according to an announcement by William P. Redding, N.A.A. executive vice president.

Mr. Nichols has been active in N.A.A. aeromodeling work for several years as president of the Association of Model Airplane Clubs of Washington, D. C., and vicinity. He is a leader member of the N.A.A. Academy of Model Aeronautics, holding the grade of administrative membership. For several years he acted as advisor to the Silver Spring (Md.) Aeronautics, an A.M.A. chapter.

He has had wide experience as a modelplane builder and flyer, and also conducted radio programs on model aviation. Before he came to N.A.A. he was associated with the Farm Credit Administration in Washington, D. C., and previous to that had been in the investment business in Boston. Mass.

The new Acting Director of Air Youth also will act in the capacity of headquarters director for the Academy of Model Aeronautics. The executive director of the A.M.A., Al Lewis, who also served as acting director of Air Youth, has been granted a leave of absence from his duties to serve in the Signal Corps of the U.S. Army. Mr. Lewis has been employed at N.A.A.'s Wash-

(Continued on page 52)

LATEST INSTRUCTIONS ON HOW TO FLY A "JENNY"

The following instructions on "How To Fly a Jenny" were picked up by an N.A.A. representative at Wright Field:

1. **Inspection:** It is best not to inspect this ship. If you do, you'll never get in it.

2. **Climbing in the Cockpit:** Do not attempt to enter the cockpit in the usual way. If you put your weight on the lower wing panel it will fall off. And besides, your foot will go through the wing, probably breaking your leg. The best way to enter the cockpit is to climb over the tail surfaces and crawl up the turtle back. Be sure to brush the gopher and squirrel nests out of the cockpit. Take care not to cut your hands on the remnants of the windshield.

3. **Instruments:** After having carefully lowered yourself into the cockpit and groped in vain for the safety belt, take a good look at your instruments; both of them. The one on the right is a tachometer. It doesn't work. The other one is an altimeter, and functioned perfectly until 1918, when the hands came off. Look at them now, for when the engine starts you won't be able to see them.

4. **Starting the Motor:** The switch is on the right. It doesn't work, for it isn't connected. However, it gives a sense of confidence to the mechanic who is pulling the prop through, as he can hear the switch click when you say "switch off." If, for some reason, the motor doesn't start, don't get out to pick up the cut and bleeding mechanic. He deserves it.

5. **Warming Up:** Don't warm up the engine. It will only run a few minutes anyway and the longer it runs on the ground the less flying time you have. After the throttle is opened, do not expose any portion of your body outside the cowling. It is no fun having your face slapped by a flying rocker arm or to be peppered with small bits of piston rings, valves, etc., that are continually coming out of the exhaust stacks.

6. **The Take-off:** The take-off is in direct defiance of all the laws of nature. If you have a passenger, don't try it.

7. **The Flight:** After you have dodged trees, windmills, and chimneys until you are over the lake, you will see a large hole in the left side of the fuselage. This hole is to allow the stick to be moved far enough to make a left turn. Don't try one to the right.

8. **The Landing:** The landing is made in accordance with the laws of gravity. If the landing gear doesn't collapse on the first bounce, don't worry—it will on the second. After you have extracted yourself from the wreckage and helped the spectators put out the fire, light a cigarette and, with a nonchalant shrug, walk (don't run) disdainfully away.

PILOT THIS MODEL HAWK P-40D

Complete instructions for building the latest model of Uncle Sam's most famous fighter

by EARL STAHL

FOR this month as a flying scale feature offer a model of the famous Curtiss "Hawk" P-40D, the fighter that is carrying the war to the Axis on the far flung battle fronts of the world.

The new Curtiss "Hawk" P-40D and its counterpart the British "Kittyhawk" are advanced versions of the well known P-40 of the Army Air Forces and the "Tomahawk" of the Royal Air Force. Speedier, with improved all-around performance, greatly increased firing power and more protective armor, they are being produced in vast, ever increasing numbers.

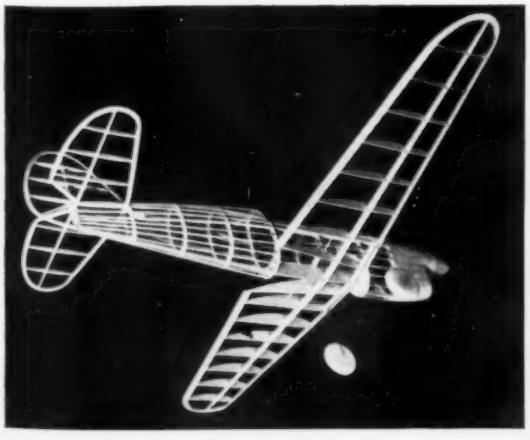
Performance figures are restricted, but it is known that the maximum speed of the Allison powered version compares with the "Spitfire's" 367 m.p.h. A similar but newer model, the P-40F, with an American made Rolls Royce "Merlin" engine is even faster. Reports from the Middle East inform us that Germany's latest 380 m.p.h. Messerschmitt Me 109F's are speedier but the more maneuverable, heavily armed R.A.F. "Kittyhawks" are considered superior. Five to one in favor of the "home team" is the African average to date! In the Pacific theater these potent fighters piloted by gallant American air-men have repeatedly demonstrated their superiority against fighters and bombers of the "Setting Sun."

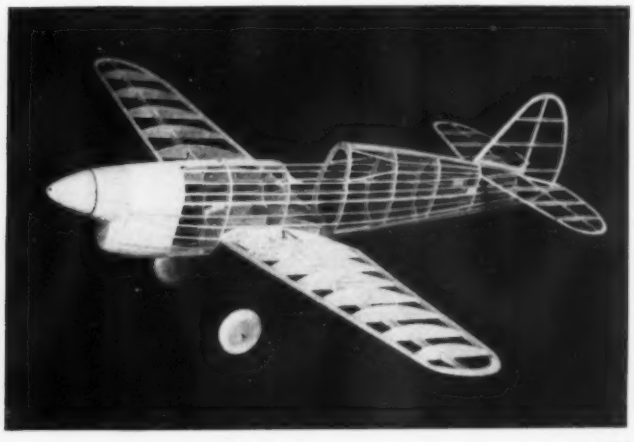
Every flying scale builder will want for his fleet a replica of this famous fighter which has the same fine characteristics as the real ship. Its appearance is unequalled, the construction easy and in performance compares favorably with any similar ship—

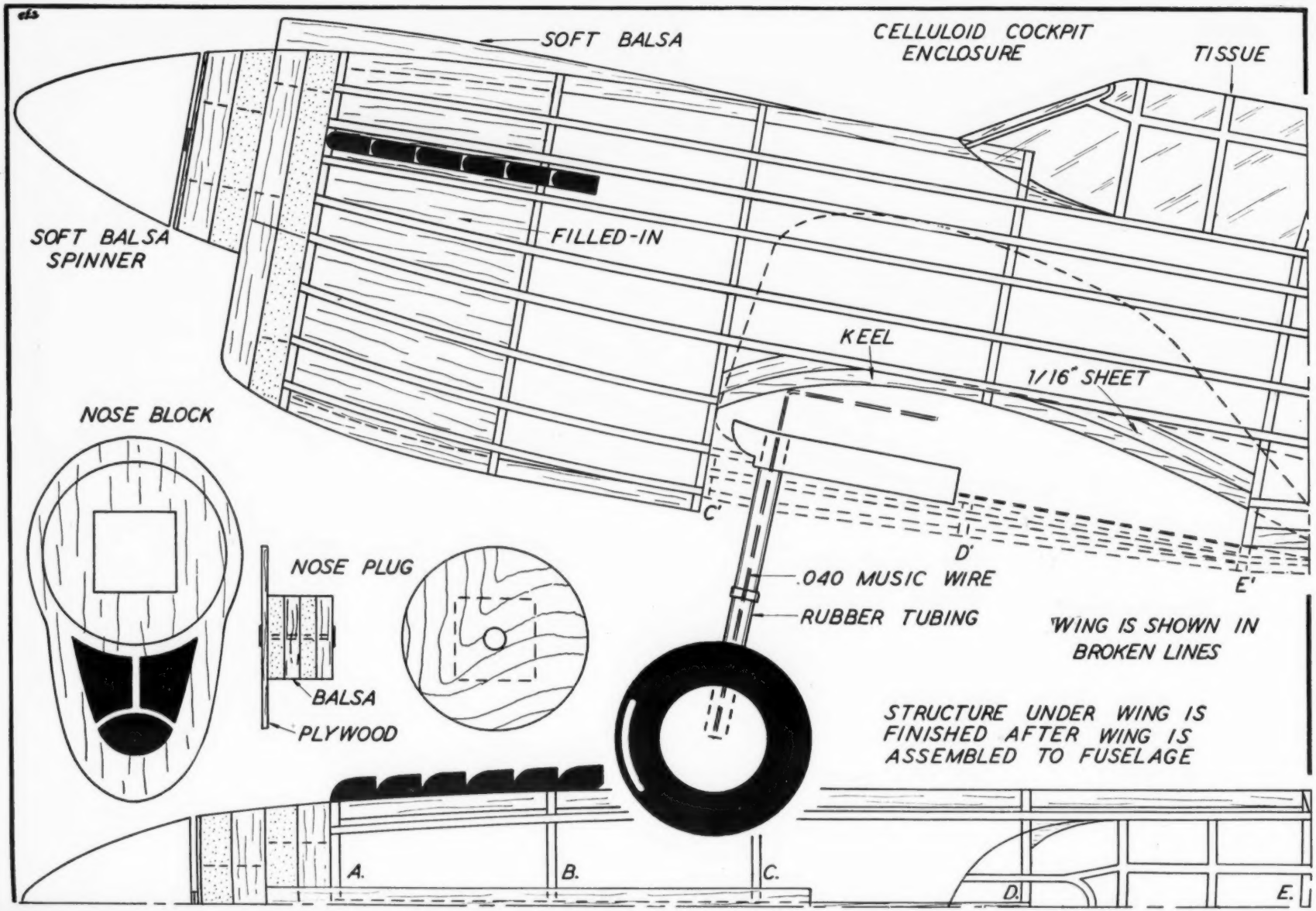
(Continued on page 38)

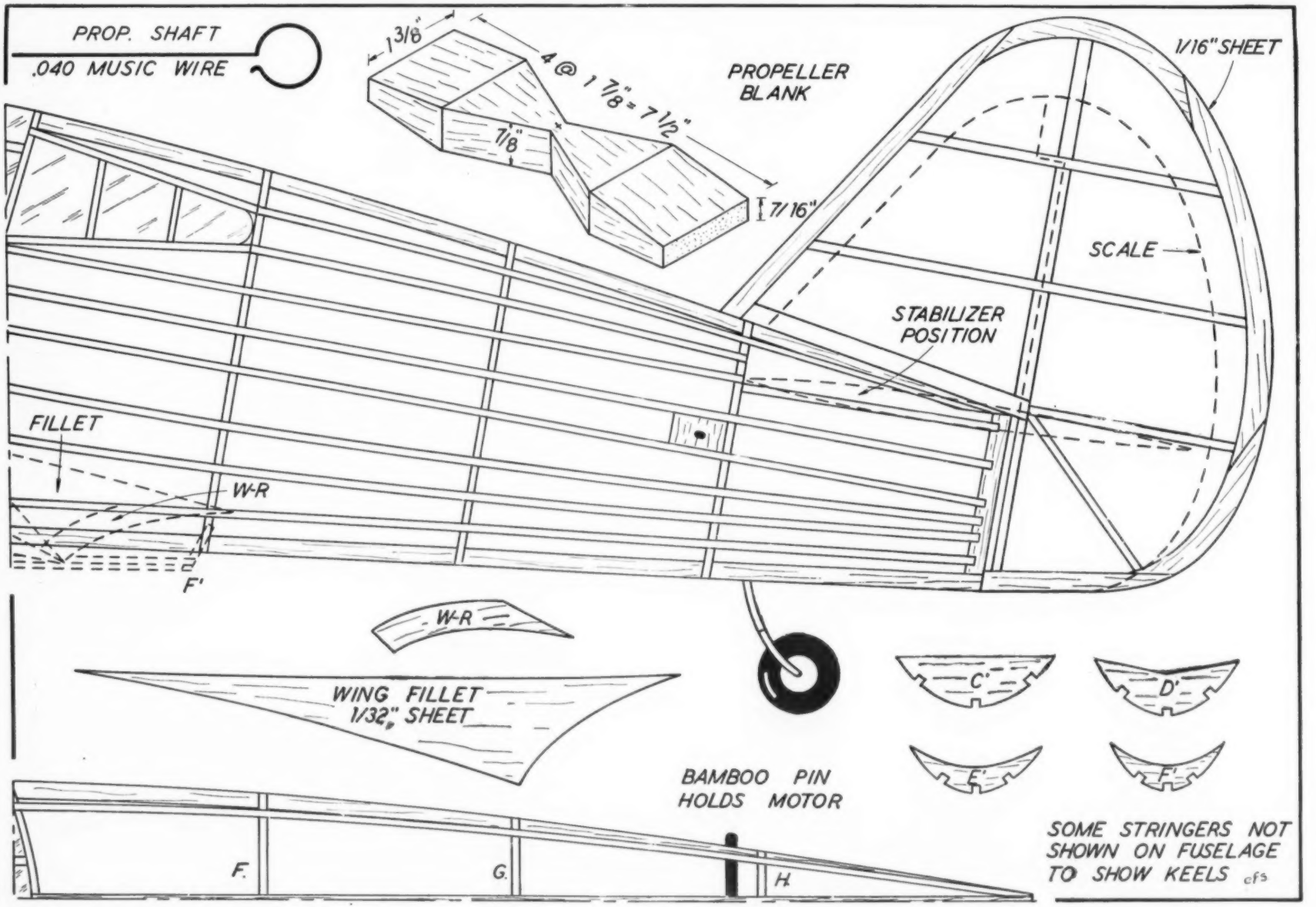
(Above) The model in action gives many thrills; an actual flight picture

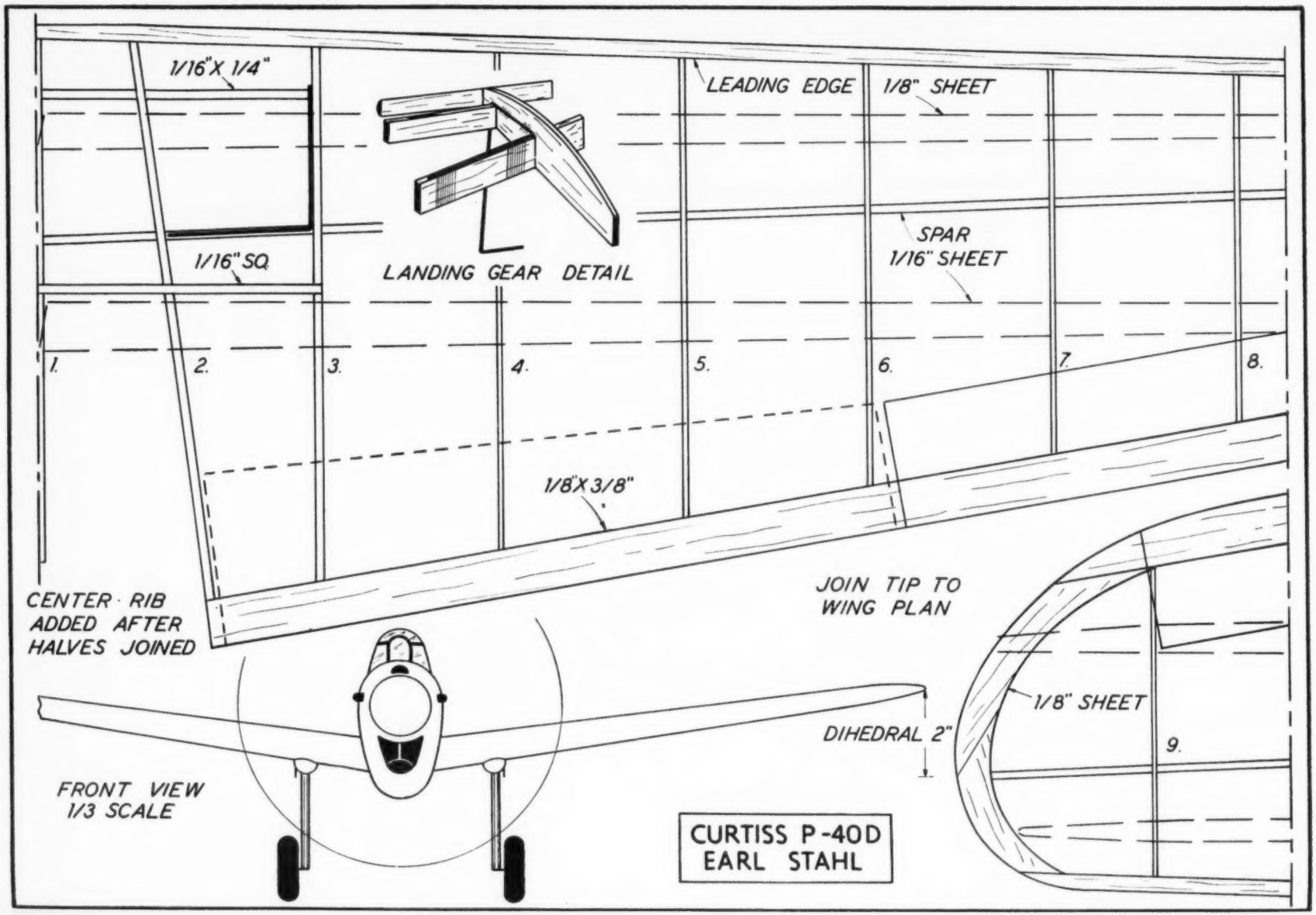
(Below) The frame—simple light and strong—ready for the covering

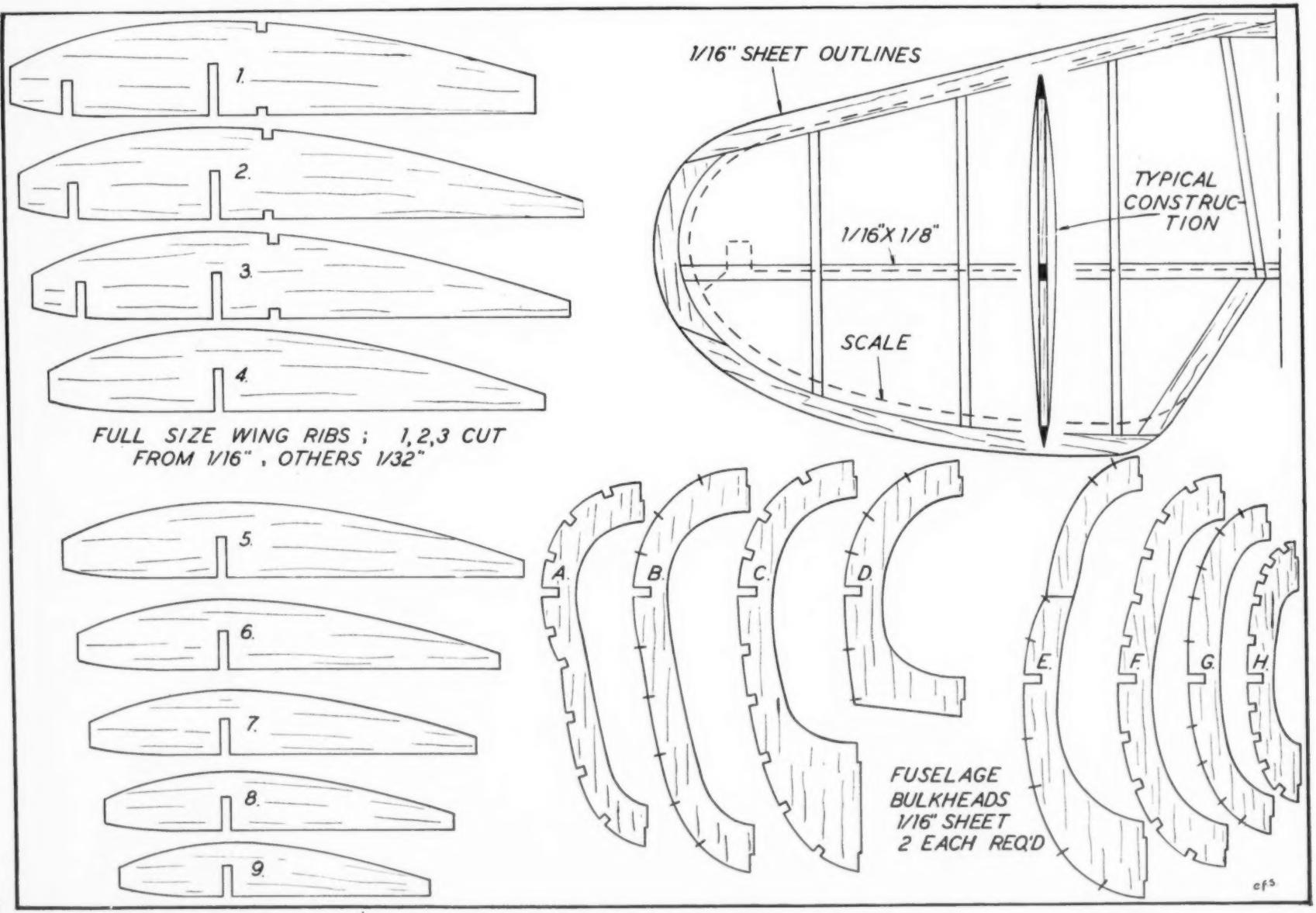





SOFT BALSA
CELLULOID COCKPIT ENCLOSURE
TISSUE
SOFT BALSA SPINNER
FILLED-IN
KEEL
1/16" SHEET
NOSE BLOCK
C'
D'
E'
.040 MUSIC WIRE
RUBBER TUBING
WING IS SHOWN IN BROKEN LINES
NOSE PLUG
BALSA
PLYWOOD
STRUCTURE UNDER WING IS FINISHED AFTER WING IS ASSEMBLED TO FUSELAGE
A.
B.
C.
D.
E.


PROP. SHAFT
.040 MUSIC WIRE
1 3/8"
4 @ 1 7/8" = 7 1/2"
1/8"
7/16"
PROPELLER BLANK
1/16" SHEET
SCALE
STABILIZER POSITION
FILLET
W-R
F'
W-R
WING FILLET 1/32" SHEET
C'
D'
E'
F'
BAMBOO PIN HOLDS MOTOR
F.
G.
H.
SOME STRINGERS NOT SHOWN ON FUSELAGE TO SHOW KEELS cfs


1/16"X 1/4"
LEADING EDGE
1/8" SHEET
LANDING GEAR DETAIL
1/16" SQ.
SPAR
1/16" SHEET
1.
2.
3.
4.
5.
6.
7.
8.
1/8"X 3/8"
CENTER RIB
ADDED AFTER
HALVES JOINED
JOIN TIP TO
WING PLAN
1/8" SHEET
9.
DIHEDRAL 2"
FRONT VIEW
1/3 SCALE
CURTISS P-40D
EARL STAHL


1.
2.
3.
4.
FULL SIZE WING RIBS ; 1,2,3 CUT FROM 1/16" , OTHERS 1/32"
1/16" SHEET OUTLINES
TYPICAL CONSTRUCTION
1/16"X 1/8"
SCALE
5.
6.
7.
8.
9.
A.
B.
C.
D.
E.
F.
G.
H.
FUSELAGE BULKHEADS 1/16" SHEET 2 EACH REQ'D
of 3

AIR WAYS

1. Bob Dagand with his skyrocket stick model flown at the Linden meet

2. Bobby Badgley, 4 years old, launches a fuselage model that he constructed. It is true, believe it or not!

News of models, builders and activities from all parts of the world

RULES, Rules, Rules—what are rules and what are they for? Those who have organized or have attended contests recently have been faced with this bugaboo of rules.

To most fliers they are merely annoyances —another problem—another restraint. Only too often are they the result of some pet whim of some particular person who, unfortunately, through lack of proper understanding of their significance, inflict them upon the whole model world.

Unquestionably the most enjoyable model contest would be one with no rules whatsoever, only one objective: duration of flight, speed or whatever event might be desired. Every year there is a battle between model builders but we must say that they have put forth every effort to arbitrate differences of opinion in this matter of rules.

A better understanding and greater satisfaction among all modelers, we believe, can be attained if each understood thoroughly what a rule is and its function. In effect a rule is a fence limiting action to a certain direction or place. Their function is to prevent any action from going beyond certain limits, or to injure, annoy or conflict with any activities outside of its particular field, and to protect planes from destruction in some way or another.

The particular rules set up for any contest should be such that they serve that particular contest to the satisfaction of all. Obviously the modelers at various contests have different interest and different problems to meet; consequently there should be a certain flexibility in rule limitations. The national contest rules certainly should not be established to meet every small condition encountered at all contests. Consequently these rules should be exceedingly broad with only the bare semblance of restriction;

3. Jack Procunier with his unique "soup spoon" gas job

4. Ray Wood launches his 2nd place "sticker" with a redesigned Lanzo wing

11. Contestant tows Roger Capwell's glider into a thermal

10. A class C fuselage model gets off at the Linden contest

these restrictions being purely in the interest of safety.

To impose a national rule which might be advocated by a modeler on the East Coast because it suited his particular flight situations might be a handicap and an annoyance to a modeler on the West Coast, or vice versa. This is to be avoided in the national rules. To make national rules which are too specific and limit to too great an extent is to dictate rather than lead or guide model activities and apparently at the present time all dictators are in disrepute.

Model Airplane News advocates the principle of national rules that do not dictate any particular structure or design in an event. For instance, to demand that dethermalizers be used, we feel, is dictation —this should be left to the judgment of the modelers. Those who have not the good sense to restrain the flight of their model, preventing its loss, deserve to lose their ships. We believe in allowing the modeler to be the judge as to what he should do in such cases but if it is desired to restrain the flight, place a penalty on those exceeding certain limits, but under no circumstances should the method of attaining this objective be stipulated by rules.

In other words, the same democratic policy forming the basis of the United States of America should be followed in making model rules. It is a greater sin to set up a dictatorial set of rules than to have no rules at all. If certain communities

(Continued on page 35)

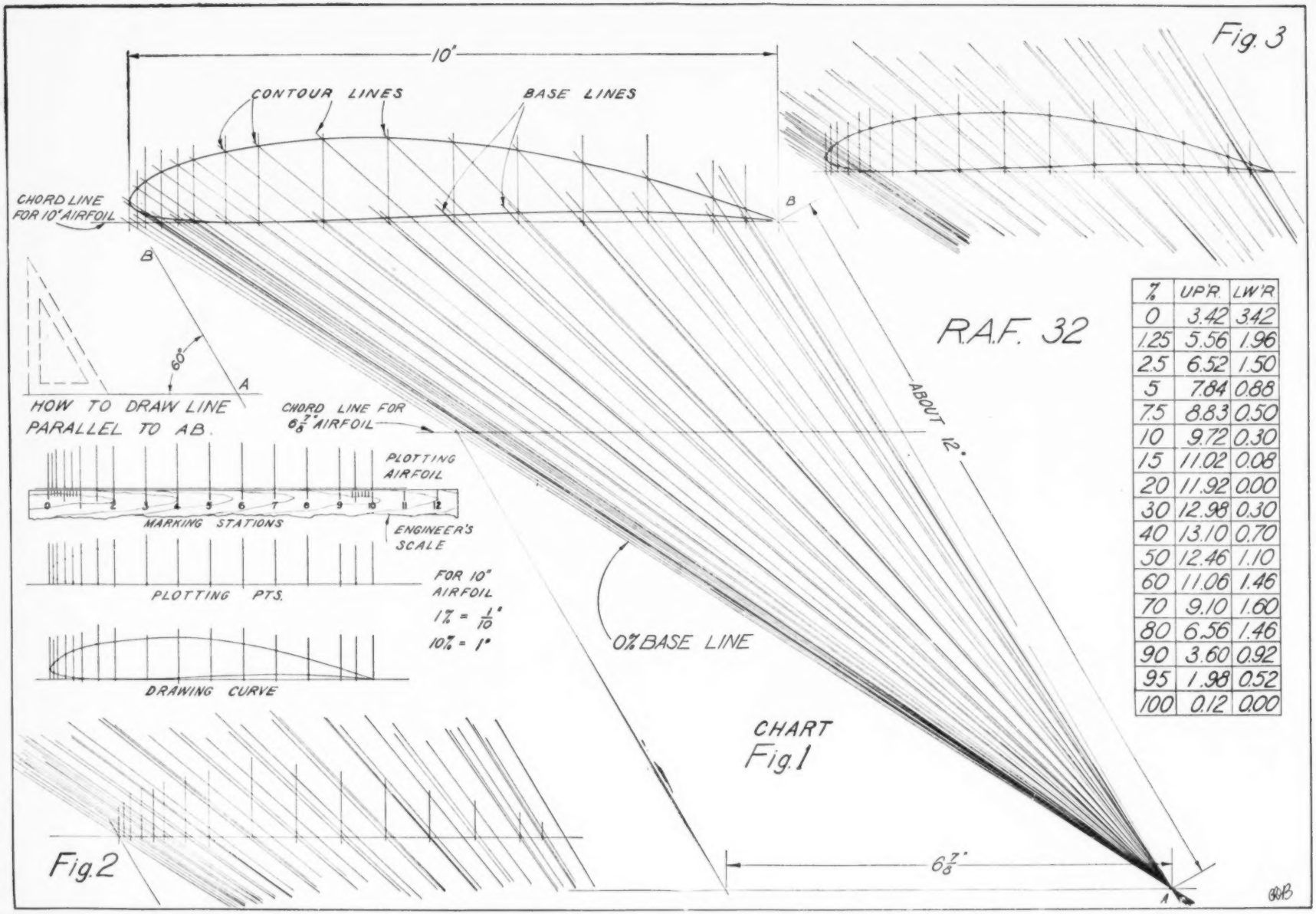
9. Paul Carlson's gas powered amphibian model flies from land or water.

8. A model Vought Corsair, that could easily pass for a full-scale plane, by Harold Harvey and Bob Myers

7. A fine flying 10 foot span, three-wheel pusher built by C. Kallaway

5. Gene Ryan with his planes that won 1st and 5th at the San Diego Aeroneers contest

6. Members of the newly formed Worcester Exchange Model Airplane Club after a flying demonstration



%	UP'R.	LW'R
0	3.42	3.42
1.25	5.56	1.96
2.5	6.52	1.50
5	7.84	0.88
7.5	8.83	0.50
10	9.72	0.30
15	11.02	0.08
20	11.92	0.00
30	12.98	0.30
40	13.10	0.70
50	12.46	1.10
60	11.06	1.46
70	9.10	1.60
80	6.56	1.46
90	3.60	0.92
95	1.98	0.52
100	0.12	0.00

AVIATION ADVISORY BOARD

Answers to perplexing problems puzzling aeromodelers — have you a question?

USUALLY when young men first begin to fly models their ship persists in reacting in every way but the right one. Then the modeler realizes there are many and apparently complicated problems to be solved before perfect flight can be attained, so he tries to fathom the riddle. Many of the answers are obvious after experiment but usually there are some difficulties which defy solution and often answers to one or two small points would throw a great deal of light on the situation.

Many of these modelers have written to us, presenting their perplexing problems. Here are a few of the answers which may dispel confusion.

L. H. Parry of 202 Worcester Street, Christ church, New Zealand, sends a number of questions of interest.

Question: What is the best tail section for a model?

Answer: When in doubt always use a uniform section with a thickness of about 1/12 the chord equally cambered top and bottom. Such a section usually proves satisfactory.

Lifting sections are sometimes used; that is, sections which are comparatively flat on the underside but cambered on the upper. These are very effective and only 75% of the normal stabilizer area is required.

Question: If polyhedral wings are used what advantage or disadvantage would result?

Answer: Polyhedral wings are wings with double dihedral; dihedral at the center and again at points between the wing center and tips. This type of dihedral tends to make the model fly a straighter course.

For instance, on fast turns where the model skids slightly, the drag rather than the lift is increased on the outside wing tip, nosing the ship away from the inside of the circle and tending to straighten the flight. The greater the dihedral of the tip section the straighter the model will fly. It has about the same stabilizing effect laterally as a straight dihedral.

Question: If the wings are covered with balsa sheet would the increase in weight compensate for increased efficiency?

Answer: It is a false assumption to assume there will be an increase in the weight. Wings can be made with sheet balsa that are even lighter than paper covered wings by eliminating the heavy spars and constructing so that the bending stresses are taken by the balsa covering.

An excellent construction is 1/32" sheet balsa acting as a top surface with ribs cemented to it. Another piece is cemented on the bottom of the ribs from the nose back along the rib to a point 1/3 the chord length from the leading edge. A small spar may be put close to the lower edge of the ribs 2/3 back from the nose. This wing will be as light as wings of orthodox construction. The efficiency will be increased considerably because there will be no sag between the ribs of the upper surface, thus providing a perfect airfoil section at every point along the span.

Question: Do you favor the following method for adjustment: Obtain the best glide and then alter the thrust line up or down horizontally for flight?

Answer: This is only advisable when there is no time to properly set the model up before flying; it is an excellent makeshift procedure.

It is better to adjust a parasol or high wing model so that the wing is about 2-1/2 degrees greater angle than the stabilizer. Balance the plane so the c.g. is 50% back from the leading edge and then adjust the thrust line so it is about 1/2 degree negative to the stabilizer, providing the stabilizer is about 1/3 of the wing area in rubber models and 25% of the

(Continued on page 62)

PLOTTING SECTIONS THE EASY WAY

by CHRISTIAN DEAN BERGER

PLOTTING individual ribs for a tapered or elliptical wing used to be a long tedious process. We say "used to be," because now, when you want to plot those ten or fifteen different ribs, you won't have to draw an individual graph, divide up odd size lines, read coordinates and estimate the position of points, again and again. Our new method of plotting looks somewhat odd, but is actually based upon the older method and is absolutely correct, mathematically. Although our new method takes only one-fifth the time, the results are just as, if not more, accurate.

The procedure is to first draw a chart (like that shown in the drawing) which is kept for permanent use; then by using this chart we can draw any size airfoil in about three minutes. A separate chart must be made for every different airfoil but it takes only about one hour to draw one, which isn't long, considering you can use it for years. That one hour investment will pay tremendous dividends in time saved later on.

The chart shown is for R.A.F. 32 airfoils of any size up to 10"; gasoleers who use larger size airfoils should make larger charts. The chart should be made on a good piece of paper. (Bristol board is excellent for the purpose.) In the upper left draw a ten inch airfoil of whatever particular airfoil you want. The 10" is chosen because it is easy to plot even by the regular method, using an engineer's scale. Readers not familiar with the regular method of plotting will find an explanation on the drawing. Now from point B (the 100% point of the airfoil) draw a line about 12" long at 60 degrees to the horizontal. From point A (the end of this line) draw lines to the intersection of the 10" chord line and the vertical station lines used in laying out the 10" airfoil. Call these *base lines.* Then draw lines from A to the points of the airfoil itself. Call these *contour lines.* Also draw a horizontal line through A. That's all there is to the chart and it is ready to use.

Suppose you want to draw a 6 7/8" airfoil. To do this, tack a piece of tracing paper over the chart and measure off 6 7/8" from point A along the horizontal line. From this point draw a line parallel to AB (i.e., 60 degrees to the horizontal). Where this line hits the *0% base line* draw a horizontal line. This line is the chord line for the 6 7/8" airfoil. The next step, shown in Fig. 2, is to draw vertical lines through the intersection points of the 6 7/8" chord line and the *base lines.* Then as in Fig. 3, mark the interesection points of these vertical lines with the *contour lines.* Connect these points with a French curve and you have a 6 7/8" airfoil. Simple, isn't it?

Here are a few further hints in using the chart: To draw a complete set of ribs for an elliptical, tapered or other shaped wing, just repeat the above procedure for each size rib needed. They can all be drawn on one sheet of tracing paper, the paper being shifted after each plotting so the ribs don't overlap.

To make templates, paste the tracing paper to some heavy paper or thin plywood and trim to shape.

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Tiger
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Forster
"OK"-
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25" FLEET OF CHAMPIONS.... 25¢

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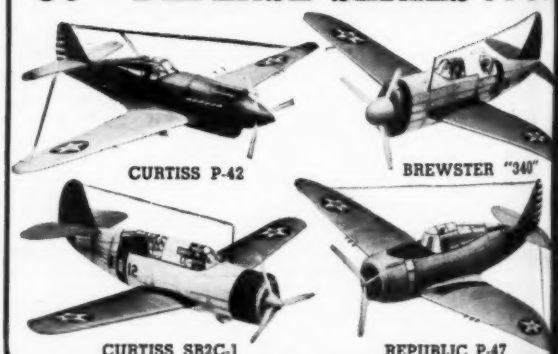

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- Wingspan—78"
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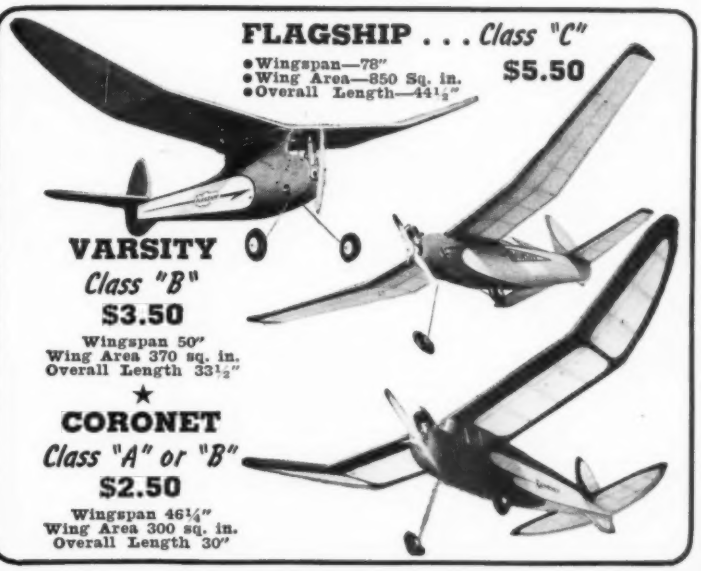

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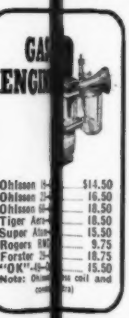
Wingspan 46¼"
Wing Area 300 sq. in.
Overall Length 30"



Ohlsson	$14.50
Ohlsson	16.50
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Note: Ohl... coil and ...rs)

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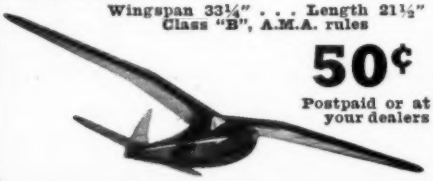
Wingspan 33¼" . . . Length 21½"
Class "B", A.M.A. rules



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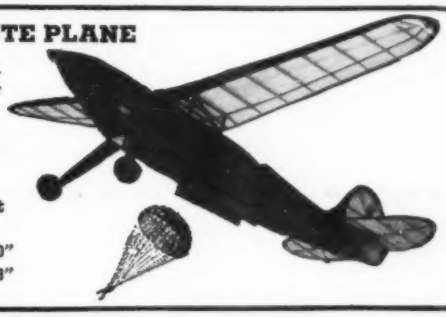
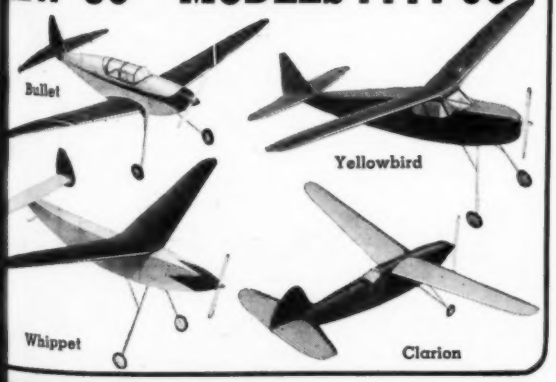
Wingspan . . . . 40"
Length . . . . . 28"



. 95

NEW 30" MODELS . . . . 50¢



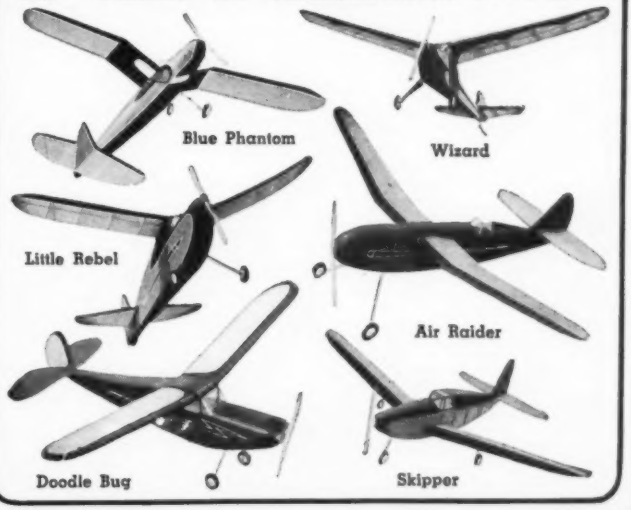
Bullet

Yellowbird

Whippet

Clarion

25" FLEET OF CHAMPIONS . . . . 25¢



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SKY SCOUTS

Learn to spot enemy planes and help defend America

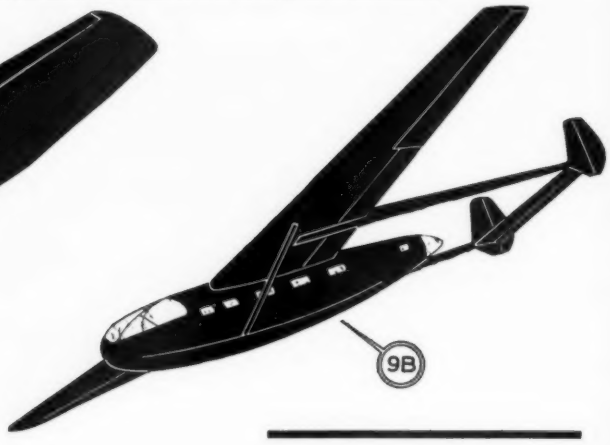
LESSON 9

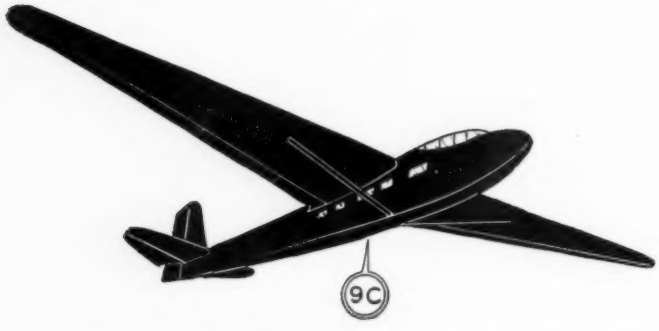
IF YOU have not already joined this patriotic group do so now by studying the silhouettes and carefully reading their description given here. Then write out the correct names of the various planes and send your answers to Sky Scouts, MODEL AIRPLANE NEWS, 551 Fifth Avenue, New York City.

So that newcomers will be able to send in correct answers to all the previous installments, they will be republished from time to time. A complete set was published in the July issue; silhouettes appearing in the August, September and October issues will be published in the November issue. Send in your answer to these back silhouette installments as soon as possible; you will receive your silver pin as soon as two sets of correct answers have been received from you.

All Scouts must send in 12 correct sets of answers, one appearing each month, to become an Expert Sky Scout; then those

(Continued on page 36)





Description of Silhouettes

PLANE 9A—Blohm und Voss Bv 141 single motor unsymmetrical monoplane designed by Dr. Ing. Richard Vogt for all-purpose tactical work. Craft has gained, and may maintain, reputation of being this war's most unorthodox creation. According to German radio broadcasts it is powered by one 1,600 hp. BMW 801 motor mounted on the port wing panel at the nose of a boom which also supports the half tail and rudder. Cabin nacelle is on the starboard wing with provisions for a crew of three. It is said to carry 2 cannons and 2 machine guns. Further Nazi claims state the craft is capable of high speed and maneuverability. Conservative figures based upon known engine performance indicate it capable of some 290 m.p.h. at 17,000 ft. The Bv 141 is now believed to be in production in Eastern Germany.

PLANE 9B—Gotha Go 242 troop transport and military cargo glider. Used in the Libyan campaign; capable of transporting 23 fully equipped soldiers or about two tons of freight. Wingspan, 79 ft.; overall length, 52 ft., 6 in. The troop-carrying nacelle is about 37 ft. long. Twin tail is supported by booms. Empty, it is supposed to weigh 3,200 lbs.; loaded, 8,500 lbs. The craft is usually towed by Junkers Ju 52/3m.

PLANE 9C—DFS 230A1 ten-seat troop transport glider designed primarily as an experimental prototype for much larger gliders used by the German Air Force, and still a carefully guarded secret. The DFS has span of some 70 ft. and overall length of 37 ft. Weight empty is reported as 1,700 lbs., loaded at 4,500 lbs. It made its first appearance at Crete. This machine and the Gotha glider have been designed by Hans Jakobs eminent German glider designer.

Answer to the three view silhouette on this page is: Nakajima 97 single seat low-wing fighter. Details published on page 38, April issue.

VICTORY

Did You Know That:

1. Glenn L. Martin built and flew a flying machine at Santa Anna, California, in 1911 without ever having seen an airplane? He worked entirely from letters and photographs received from the Wright Brothers?

2. According to representatives of American companies, recently returned from Japan, Japanese aircraft workers copy American airplanes so faithfully that tool marks, department numbers and even inspectors' names or initials placed on subassemblies here in the U.S. are found on parts going into Japanese-built American planes such as Douglas transports?

3. Admiral Richard E. Byrd has received every decoration it is possible for the United States government to award?

4. Winston Churchill, Prime Minister of Great Britain, actually handled the controls of the huge flyingboat in which he returned to England after his recent visit to Washington? Benito Mussolini is another national leader who pilots his own airplane?

5. The controllable pitch propeller, installed on a Liberty-powered DH-4 in 1919, was first experimented with by U.S. Army Air Service men at Kelly Field?

6. Wiley Post's loss of an eye started his aviation career? With the insurance money (from the oil company for which he worked "dressing" drilling "bits") he purchased an airplane and taught himself to fly. He is the only man to have twice circumnavigated the globe, the only man to do it alone?

7. David Sinton Ingalls was the only World War I Navy ace? He shot down five German airplanes while on duty in the

(Continued on page 36)

12. Ray O'Connell, junior fuselage and high point winner, with Bob Smith, junior glider winner, at Linden

13. Dick Miannay, senior glider winner; Russ Hiltz, senior fuselage and high point winner, and Cliff Fenn, fuselage winner

Air Ways

(Continued from page 29)

wish to fly under greater restrictions they can do so under this system. National rules should set down certain absolutely necessary limits for all the country, limits which will be acceptable and just for all model builders and then, if desired, further restrictions may be established by any individual club or contest group to fit their particular needs.

The wisdom of this policy certainly cannot be doubted and should be followed, we believe, by the National Rules Committee.

One of the objections to the present rules that has been noted in many sections is the limit of a 6 minute maximum flight. We believe it is in the best interest of all to have no limit, or to have a higher one. Under the 6 minute ruling the possibility of judging the better ship from the mass of inferior ones becomes a critical and desperate undertaking, failing to eliminate the predominance of luck.

Another bone of contention is the problem of launching; some advocate hand launching and some believe that ROG should be the procedure. Unquestionably to ROG a ship presents greater problems and when requiring this added test the better flier and ship may be judged with greater ease. Naturally those who are less expert will object to the difficulties imposed by ROG and will "raise a howl" against such restrictions. However, it is often necessary to impose this added problem to pick the plane that wins through merit rather than luck.

To say that it is impossible to ROG ships in some fields is quite true but elimination of the ROG rules in such cases merely makes it more convenient for contest directors who fail to take the interest and the time to provide proper runways. If proper runways are established there will be no problem in ROG'ing a well designed airplane.

Even with the knowledge and realization of all these factors there still will be "kicks" about ROG, so the obvious answer is to establish two events: hand launch and ROG. Then those who are not capable and sufficiently expert to solve the ROG problem may fly in the more elementary class.

This discussion, it must be admitted, has been prompted mainly by letters printed in the July issue of the "F.G.M.A. News," Fresno, Cal., written by Mr. Anthony Chausse and answered by Mr. Arle Armstrong.

The group of modelers under Mr. Chausse are not entirely in favor of the present national rules and prefer to establish their own which meet their particular flight conditions and desires more fully. This we believe is wise. Under the leadership of Mr. Armstrong the Fresno Gas Model Association prefers to fly under the national rules. Both are right in carrying out this procedure and no fault should be attributed to either. We would say that the fault lies in the national rules and policy. If the policy of broad national rules and specific local rules is carried out, as suggested here, it should eliminate arguments, discussions and in some cases possible antagonism. It is hoped that the National Rules Committee will take these things into account before their next annual meet.

The great story of how model airplane activities have educated the young men of America in the basic facts of aeronautics is told by picture 2. Look at this picture. This was not staged for promotion purposes or the glorification of some new "movie," but is the living story of what 22 years of model training has done for a 4 year old boy, a member of the coming flying generation of America. No, this is not a misprint; Bobby Badgley, shown flying the airplane which he constructed, learned model building from his dad, Russell A. Badgley of 5134¼ Elizabeth St., Bell, Cal., who started his model flying about 22 years ago.

Mr. Badgley senior is one of those ardent model fans with which America has been afflicted during the past years—with excellent effect in our present war industries and armed services. It is only natural then that Bobby was born with a great deal of his dad's natural talent. Then under the latter's tutelage and guidance Bobby's nat-

(Continued on page 56)

14. Tony Mazzeo's Skyfarer takes to the "blue"

15. Members of Easton Model Club at a recent interclub contest

WAR RATIONS!!

Very soon there will be no more balsa, no more rubber, no more of the things we took for granted. Therefore, we earnestly urge all model designers to start building models with materials which can be obtained without hindering war production. Here is a list of basic materials which will be available for quite some time. See what you can do with them!

JASCO-PINE Wood cut from one of our lightest pines. Discovered during our search for balsa substitute. It will take place of balsa without trouble. About twice heavier than heavy balsa. Sheets up to 1/16th can be cut with razor into ribs, bulkheads and other irregular shapes. Thicker stock should be cut with jig saw. Ordinarily cement will do, but try the new plastic glues. JASCO-PINE is cut smooth and to the exact size, just as you would expect from JASCO.

36" JASCO-PINE Sheets (1¾" Wide)

1/64	.8c	3/32	.10c	1/4	.14c
1/32	.8c	1/8	.10c	5/16	.16c
1/20	.8c	5/32	.12c	3/8	.18c
1/16	.8c	3/16	.12c	1/2	.20c

36" JASCO-PINE STRIPS

1/16 sq.	.3 for 2c		5/32 sq.	.2 for 3c	
1/16 x 1/8	.1c		3/16 sq.	.2c	
1/16 x 3/16	.3 for 4c		3/16 x 1/4	.3c	
1/16 x 1/4	.2 for 3c		3/16 x 3/8	.2 for 7c	
1/16 x 3/8	.2c		3/16 x 1/2	.4c	
1/16 x 1/2	.2 for 5c		3/16 x 5/8	.5c	
3/32 sq.	.1c		1/4 sq.	.3c	
3/32 x 3/16	.2 for 3c		1/4 x 3/8	.2 for 7c	
3/32 x 1/4	.2c		1/4 x 1/2	.4c	
3/32 x 3/8	.2 for 5c		1/4 x 5/8	.2 for 9c	
3/32 x 1/2	.3c		1/4 x 3/4	.6c	
1/8 sq.	.2 for 3c		5/16 sq.	.5c	
1/8 x 1/4	.2c		3/8 sq.	.5c	
1/8 x 3/8	.3c		3/8 x 1/2	.6c	
1/8 x 1/2	.2 for 7c		1/2 sq.	.7c	

48" JASCO-PINE STRIPS

1/8 sq.	.2c	3/16 sq.	.3c	5/16 sq.	.6c
5/32 sq.	.2c	1/4 sq.	.4c	3/8 sq.	.7c

36" J-P TRAILING EDGES (Beveled)

3/8 x 3/32	.3c	3/4 x 3/16	.6c
1/2 x 1/8	.4c	7/8 x 5/32	.7c
5/8 x 5/32	.5c	1 x 1/4	.8c

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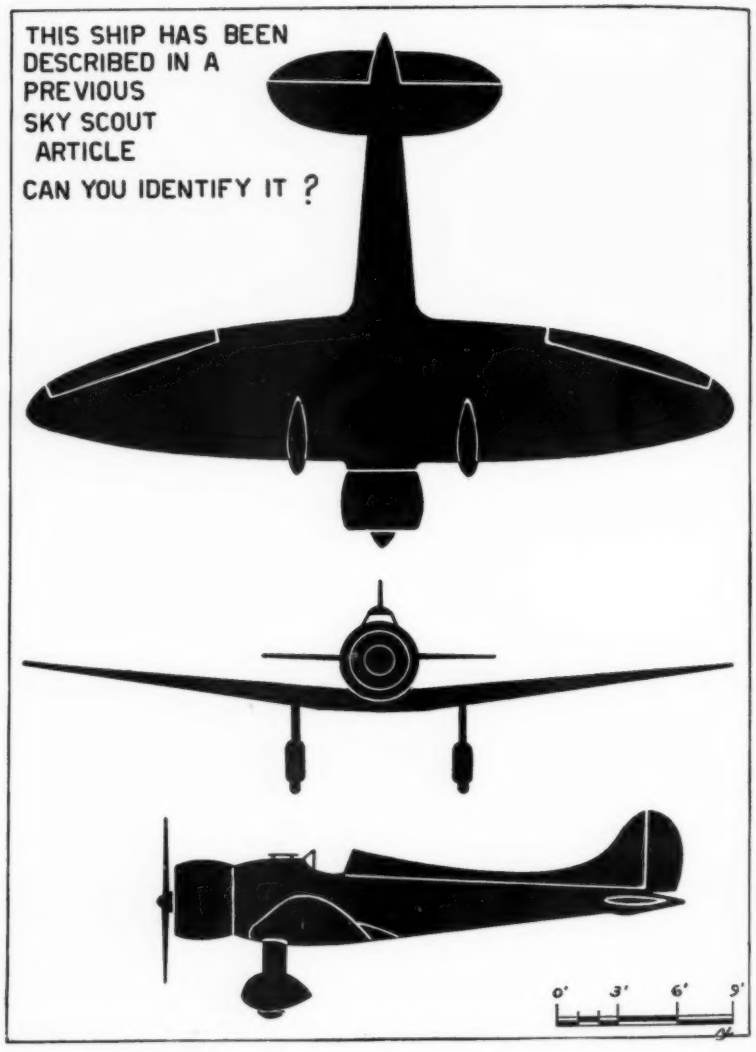
See page 55



Sky Scouts

(Continued from page 34)

qualifying will receive a gold Sky Scout pin. Seven sets have been published previous to this installment.

Silver Sky Scout pins have already been sent to all those who have submitted two sets of correct answers for the silhouettes appearing monthly. Also cards have been sent to Scouts who are one of a group in any community. On these cards are listed the names of all other Scouts residing nearby, thus enabling them to form a Sky Scout unit. Each Scout can learn much more about enemy planes if he belongs to a group.

It is suggested that meetings be held to study distinctive features of the various ships; if desired, models can be made of these ships and hung up in the clubroom.

When Scouts qualify by sending in 12 complete sets their names will be sent to their defense headquarters with explanation of their qualifications to serve as airplane spotters in their community. In this way young Americans can render vital service to their country.

The description of the silhouettes given with this lesson appears on page 34.

Did You Know That:

(Continued from page 34)

North Sea region, only Naval flier to accomplish the feat?

8. Igor Sikorsky was a famous airplane designer and builder in Russia during the first World War? He designed the first four-motor bombing plane in 1913?

9. Face powder made many aviation records possible? Jacqueline Cochran, woman speed flier who has set many speed, distance and altitude records, purchased her many speed planes with money derived from the sale of her "Wings To Beauty" cosmetics which bear her name?

10. Baron Manfred Frieherr von Richthofen used to award himself a silver trophy cup with date, plane number and crew names engraved thereon, for each Allied plane he shot down? He scored 80 in all.

11. Cecil B. DeMille of Hollywood motion picture fame was the earliest Pacific Coast airplane operator, owning three airports and a dozen airplanes in the early 'teens and 'twenties?

12. Alexander P. deSeversky, designer of the famous Seversky pursuit planes (now Republic), lost his leg while flying

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SB-11	Junkers JU 87B	.35
SB-12	Junkers JU 88A1	.50
SB-13	Dornier DO-18K	.80
SB-14	Mitsubishi 96	.20
SB-15	Nakajima 97	.35
SB-16	Nakajima 95	.35
SB-17	Hurricane	.20
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SB-19	Russian Fighter I-16	.20
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SERIES SA

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SA-3	Douglas Dauntless SBD-3	.35
SA-4	Vought-Sikorsky OS2U-1	.35
SA-5	Douglas Devastator TBD-1	.35
SA-6	Consolidated PBY-5	1.00
SA-7	Consolidated PB2Y-3	3.00
SA-8	Bell Airacobra P39D	.20
SA-9	Curtiss P40E	.20
SA-10	Northrop A-17A	.35
SA-11	Douglas A-20A	.50
SA-12	Boeing B-17E	1.00
SA-13	Douglas Transport DC-3	1.00
SA-14	Messerschmitt ME 109	.20
SA-15	Heinkel HE-3	1.00
SA-16	Sento Ki-001	.20
SA-17	Baka Geki Ki-99	.35
SA-18	Mitsubishi 96	.80
SA-19	Spitfire	.20
SA-20	Wellington Bomber	1.00

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A large part of the Megow plant is now engaged in war production for the Navy, and although "Every Day is Navy Day at Megow's", the production of regular lines is continuing. If an occasional delay occurs, we feel sure our dealers and customers will understand that the Navy must always *be first.*

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for the Russian Airforce when he was shot down by a German airplane, fell into the Baltic Sea and nearly drowned in 1916? He has worn an artificial leg ever since although he has continued to fly and attend functions without a hint of infirmity.

13. A Ford tri-motor was buried in ice for four years, re-fitted and flown successfully completely without repairs? In 1929 Admiral Byrd decided to bury his famous "Josephine Ford" monoplane in the Antarctic rather than bring it back to America. In 1933 he returned and used the airplane for dozens of flights in that frigid region.

14. The Curtiss (now Wright) engine was created and used long before the famous Curtiss airplanes? Glenn Curtiss, building motorcycle engines in 1900, built several aviation engines for Thomas Scott Baldwin in 1901-04. A Baldwin airship, with Curtiss engine, the SC-1, was the first purchased by the Navy in 1909.

15. The famous Henderson Brothers, Cliff and Phil, for many years sponsors of the National Air Races, are now engaged in the operation of a series of indoor ice-skating rinks in Southern California?

16. It has been widely believed that the Chinese were building and flying airplanes long before the Wright Brothers? Due to the fact that the Chinese have written little history and feats of their ancestors are carefully guarded family secrets, it is entirely possible that Chinese pilots were aloft in flying machines as early as 1300! Recent investigations on this study are being continued and perhaps soon our entire aviation history may be rewritten.

17. The Dutch East Indies Air force is using German Junkers and Dornier bombers and flying boats to bomb Japanese (Axis)-held territories, men and ships?

18. If an airplane could climb to fifty miles it could fly coast-to-coast in 2¼ hours—without moving? At this great height it would not be affected by the earth's rotation and could remain aloft for this period while the earth sped by below. When its destination approached it need only drop and land, according to recent investigations and predictions of future air travel.

19. Last reports reveal a German Dornier flying boat, first taking the air in 1924, still flys over Lake Constance in Germany? After 18 years of service it is still going strong. If you know of an airplane exceeding this record, send in your claim.

VICTORY

Pilot This Model Hawk P-40D

(Continued from page 23)

a picture on display or in flight. Standard construction methods are used throughout, nevertheless, it is advisable to study the plans and instructions thoroughly before building.

CONSTRUCTION—Use of keels, cut from sheet balsa, simplifies assembly of the fuselage and aids in making the structure more accurate. Trace the top, bottom and two side keels on 1/16" sheet balsa and then with a sharp razor blade cut them out. The section between D and E has no support at the top (cockpit opening) but a curved piece conforming to the wing upper surface is placed at the bottom as indicated. Bulkheads also are cut from 1/16" sheet and two of each are required. Notice that not all bulkheads have notches for stringers; cut out the notches shown and mark the positions of others which are cut later as needed.

Pin the keel pieces over the fuselage plan to begin actual assembly. Cement half of the bulkheads to their respective positions, aligning them so they are exactly perpendicular to the keels. Attach a side keel and, when the cement has hardened, remove this frame from the plan and add the remaining bulkheads and keel. Stringers are medium grade 1/16" sq. strips. Using a razor blade that has been broken to a sharp point, cut the necessary notches for stringers as the work progresses. Once a stringer has been attached to one side, always place one in the corresponding position of the other side to avoid pulling the body out of line. Pieces of hard 1/16" sheet cemented between the stringers provide the anchorage for the bamboo pin that holds the rubber motor in the rear.

As indicated on the plan, the front portion of the fuselage is filled-in with pieces of very soft 1/16" sheet. Individual pieces of balsa are cut so as to fit snugly within the space between the bulkheads and stringers. The extreme front of the nose is shaped from four pieces of 1/4" laminated sheet balsa. Broken lines indicate how the nose is hollowed to receive the nose plug and for lightness. Cement the nose block to the front bulkhead and, when dry, cut and sand the entire fuselage front to a smooth, accurate shape. Where the wing fits in, curved 1/16" thick pieces are cut to fit exactly to the airfoil shape.

It is necessary for the wing to be of strong construction since the landing gear is attached to it. It will be necessary to make a drawing of the left wing so both halves can be assembled directly over full-size plans. Ribs 1, 2, and 3 are cut from 1/16" sheet while the others are 1/32" sheet. Sand them carefully to exact shape and size and cut the notches for spars. Spars and leading edge are cut from sheet stock as indicated and the trailing edge is a tapered 1/8" x 3/8" strip. Tips cut from 1/8" sheet are assembled over the plans. Use pins to hold the various pieces in place until the cement has set. Join the wing halves with 2" dihedral at each tip; then add the single center rib and the several short 1/16" sq. spars. Next attach the 1/4" deep landing gear spar and reinforce the joint necessitated by the dihedral angle. Finish the wing by cutting and sanding edges and tips to conform to airfoil shape.

The landing gear struts are fashioned from .040 music wire. The wire is bent in such a manner as to join the spars and rib 3 as detailed on the drawings. Be sure to make a right and left strut. With thread bind the struts to the spars and then use a needle and sew right through rib 3 and about the wire. Apply several coats of cement to the thread wrappings and adjacent areas. Incidentally, the rubber tubing covers are not slipped on the struts until the wing has been covered.

Using a sharp razor blade and sandpaper, wheels can easily be made from laminated

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Ample reserve stocks of standard and "hard-to-get" items sufficient to fill your needs! SKYWAY won't "let you down!" As you will observe from listings AND PRICES BELOW, here is variety—at our customary MONEY-SAVING values! INVEST THE DIFFERENCE IN DEFENSE STAMPS!

HANDIEST Double-Edge CUTTING TOOL EVER MADE!

SKYWAY All-Metal UTILITY KNIFE **10¢** Incl. Double Edge Blade

CAN'T SLIP! Double-edge blades! 6" tip-to-tip! Refilled in a jiffy! MAIL SPECIAL: UTILITY KNIFE plus 2 EXTRA blades 25c postpaid (coin or stamps).

18" BALSA STRIPS Select, Hard Stock

1/16 sq. 30, 5c
1/16x1/8 15 for 5c
1/16x3/16 10, 5c
1/16x1/4 8 for 5c
3/32 sq. 20 5c
1/8 sq. 15 for 5c
1/8x3/16 10 for 5c
1/8x1/4 8 for 5c
3/16 sq. 6 for 5c
1/4 sq. 5 for 5c
1/4x1/2 2 for 5c

18" Balsa Sheets
1/64x2 5 for 10c
1/32x2 6 for 10c
1/16x2 5 for 10c
3/32x2 4 for 10c
1/8x2 4 for 10c
3/16x2 3 for 10c
1/4x2 2 for 12c
1/2x2 each 8c
3" & 36" cost twice 18"; 3x36, 4 times

NOSE BLOCKS
1x2x1 .....1c
2x2x1 .....2c
2x2½x1 .....3c
3x3x1 .....4c
3x3x2 .....7c
3x3x3 .....9c
5x5x2 .....17c

5 FOOT BALSA Minimum 50c

1/8x1/16 .....8 25c
1/8x3/16 .....8 25c
1/8x1/4 .....7 25c
3/16 sq. 6 25c
1/4 sq. 5 25c
3/4x1/2 .....3 25c
3/8 sq. 2 25c
1/2 sq. 2 25c
Sheets, 4 times 18".
Double the above price for genuine aircraft SPRUCE

18" Balsa Planks
1/2x1/2 ....3 for 10c
1x1 .....each 10c
1x2 .....each 15c
2x2 .....each 28c
2x3 .....each 40c
2x6 .....each 85c
3x6 .....each $1.25

Plastic Balsa
4 oz. 29c, Tube 10c

PROP. BLOCKS
1/2x 3x3x5 4 5c
1/2x 3 4x 6 3 5c
5x5x 1x 8 2 5c
3x3x11/4x10 ea. 3c
3x3x11/4x12 ea. 4c
1x11/2x12 ea. 6c
1x11/2x15 ea. 9c

Plywood—1/16
1/8, 3/16, 1/4 40c ft.

SKYWAY FOR GAS MOTORS

Ohlsson "19" $16.00
Ohlsson "23" 18.00
New Ohlsson "60 Special" 20.00
Cannon 'B' $18.50, 'C' 19.75
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Rogers "29" $14.00—"35" 14.50
Gwin Aero $15.00, Tiger Aero 18.50
Sky Chief 7.95

TRADE-INS ACCEPTED! TOP CASH VALUE ALLOWANCE for old motor towards purchase of a new one!

CEMENT
CLEAR DOPE THINNER
Banana Oil
1 oz. 6c, 1/2 pt. 40c
2 oz. 11c, pint 60c
Colored Dope
1 oz. 6c, 2 oz. 11c
1/2 pt. 45c, pt. 70c
MICROFILM
RUBBER LUBE
WOOD FILLER
LIQUID
CELLULOID
1 oz. 9c 2 oz. 15c

G. M. SILKSPAN
White, Red, Yellow, Orange, Blue
3 for 25c.—"OO" —5c per sheet.
Gas Model Silk
H'vy qual. 75c yd.
AA TISSUE
All col., doz....35c
Silver, ea.....5c
Superslik, wh. 5c

Bamboo Paper
White 6c, 5 for 25c
Colors, 2 for 15c

Trexler Wheels
1¼, 1½—45c
1¾, 2—55c
2¼, 2½—60c
Gas Mod. 2¾-1.10
3-1.40—3½-1.65
4½-1.95

M&M WHEELS
1½, 1½, 1¾ 60c
1¾, 2 2½, 70c
Gas Mod. 2½ $1
Flyweight " 85c
NEW 3" $1.10
3½ 1.60, 3½ 3.00
Tin Water Sprayer..... 5c

PROPELLERS
Balsa Paulo Ritz Wina Gas
5" 4c-10c Mod.
6" 5c-10c 8" 40c
7" 6c-15c 9" 40c
8" 7c-17c10" 40c
9" 8c-21c11" 40c
10" 9c-25c12" 40c
12"10c-30c13" 40c
14"12c-50c14" 40c
15"15c-60c15" 50c
16"16c-X 16" 50c
18"25c1.25 18" 65c

RITZ Gumwood
8"-9"-10"-11" 20c
12"-13"-14" 20c

GAS MODEL ACCESSORIES

Champion Spark Plugs 1/8 or 1/4 50c
Condensers—Metal, 20c Smith....25c
Plugs & Jacks, Set of 2-35c val. 25c
Midget Tip Jacks 25c val. 2—15c
Terminal Clips 5/8" 10c val. 4— 5c
Gas Funnel, Copper strainer.... 30c
Spaghetti Tubing 1/16" 3 ft.—10c
Toggle Switch 25c. Lightweight..15c
SAE 70 oil—1/2 pt. 25c. Pint....40c
12" High Tension Leads—Best....15c
18 strand H.T. leadwire, 3 ft....10c
Booster Leads, 75c value, per set. 50c
Masking tape—1/2x36-instruc. card 5c
Alligator Clips—2/15c Solderless 10c
Xh'st Manifold—Keep Ship Clean
Nickel plated 50c. Streamlined $1.00
Spark Plug Wrenches—any size 25c
Neoprene tubing per foot..... 20c
X'haust manifold nickle-plated.... 50c
X'haust manifold streamlined....$1.00

VOIT WHEELS
3½ 1.60, 4½ 1.85
Race Car Set 6.00
Ball Bearing 8.00

COILS
Smith 3 V....$2.75
Competitor ..$1.95
Superlite $1.75
Aero-Coil $2.25
Brown Blue..$1.25
U.S. Coil ...$1.50
Wing & Tail Lts. (3 in a set)
5/16, 8c 9/16 10c
11/16 12c per set

TIMERS
Austin $1.50
Dural 1.95
Hillcrest .. 1.25
Time-Alre . 1.00

DURAL ANGLE
1/2x1/2 .....20c ft.
3/4x3/4 .....30c ft.

RITZ FOLDING PROPELLER
9", 10" or 11" each $1.00

ALUM. TUB'G per ft.	BRASS TUB'G per ft.
1/16.....8c	...10c
3/32, 1/8...10c	...15c
3/16, 1/4 15c	...18c

Sheet Alum. 1/2 ft. .003 25c .010 35c

Rogers Class 'B' Motor NEW RMC-2
BLOCK-TESTED READY-TO-RUN GUARANTEED
$9.75 Trades Accepted

FREE POSTAGE ON ALL U. S. A. ORDERS.
SHIPPING INSTRUCTIONS: Packing cost on all orders 10c, 30c or 5 ft. 20c. To packing add 15c% postage for U.S. possessions, Canada and foreign when order is over $1 and 15c if under $1.

MINIMUM ORDER 50c

ACCESSORIES RUBBER POWERED

Model Pins 1/2 or 1" 100 for..... 5c
Sheet Celluloid 5x7 5c, 14x17....20c
Ball Bearing Washer.....10c
Sandpaper, 12 sheets 5x5.....5c
Lilliput Lights—for display model, 3 lamps, wired, instruction sheet. Per set.....90c
Insignia 36—American, French, English, German, Squadron, in colors, gummed, per sheet..... 5c
Washers, pinhole, 1/8, 1/4, 2 doz. 5c
Prop Shafts, doz sm. 6c, large....10c

NOSE PLUGS For 5c; 1/2"-3 3/4"-4; 1"-3

MUSIC WIRE

.014 .....3 ft. 2c
.020 .028 3 ft. 3c
.034 .040 3 ft. 4c
.049 .....3 ft. 5c
1/16" .....3 ft. 6c
3/32" ....3 ft. 10c
1/8" .....3 ft. 15c

BROWN RUB'R*
1/16 sq. 6 ft. 5c
1/8 flat 6 ft. 5c
3/16 flat 5 ft. 5c
*Rubber in limited quantity, sold if accompanied by order for other merchandise.

Camel H'r Brush
Med. 8c, Lge. 10c
Small 5c, Gas Mod. 20c

Thrust Bearings
1/2 doz. Sm. 8c
1/2 doz. Lge. 12c

Celluloid Radial ENGINES
1½" 10c, 2" 15c
2½" 20c, 3" 25c
4" 65c, 4½" 75c

MACHINE GUNS
3/4" 3c, 1¼" 4c
1¼" Lewis.... 5c
1¾" Lewis.... 6c
1¼" Ring Mt. 15c
1¾" Ring Mt. 20c

SKYWAY MODEL AIRCRAFT SUPPLY CO., 426 SIXTH AVE., DEPT. M, BROOKLYN, N. Y.

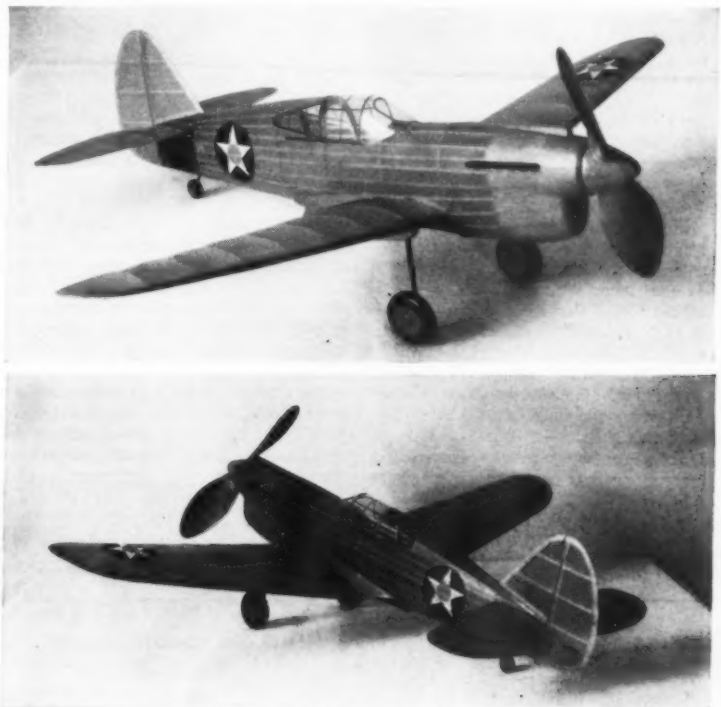
discs of hard balsa. Washers or other bearings cemented to the sides will make them revolve freely and accurately.

Tail surfaces come next and both stabilizer and rudder are of similar construction. Make complete frames using 1/16" sheet outlines, 1/16" x 1/8" strips for spars, and 1/16" sq. pieces for ribs. When dry, remove these frames from the jigs and attach 1/16" sq. strips of soft balsa to each side of each rib. Ribs are later cut and sanded streamline and the leading and trailing edges are tapered to conform to the rib shape.

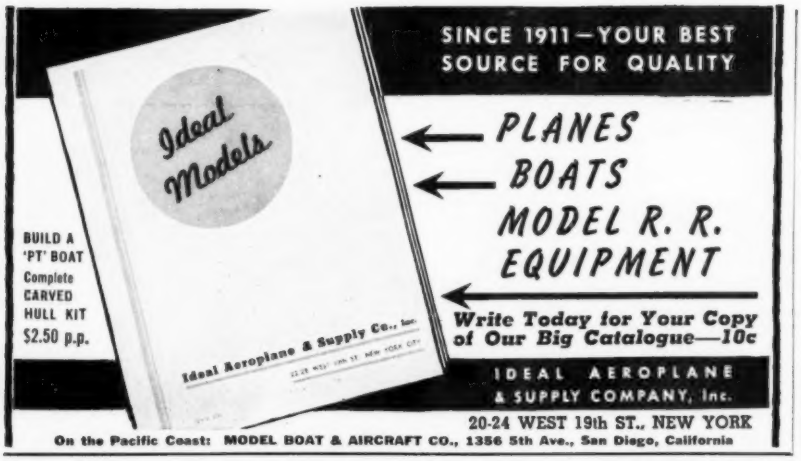
For best flight performance your "Hawk" must have an efficient propeller. Select a hard block and cut out the blank as shown. Drill a hole for the shaft, then start to cut away the back surface of the blades; a bit of undercamber is desirable. Now cut away the front of the blank until the blades are of the desired thickness. Round the tips and reduce the depth of the hub. Use rough and then fine sandpaper to finish the job and bring the blades into balance. Apply several coats of clear dope with light sanding between each to smooth and toughen the wood. Shape the spinner from a light grade balsa block, then notch it so it will fit neatly over the prop hub. Before the spinner is permanently attached, the freewheel gadget should be considered and if none is being used, the propeller shaft must be securely anchored.

The removable nose plug is made of laminated squares of hard 1/8" sheet with a plywood disc at the front. Drill the hole so the thrust line will tilt slightly to the right for proper circle under power. Washers cemented to the front and back of the plug will fix the line of thrust.

COVERING AND ASSEMBLY—Do not be fooled by the pictures of the uncovered structure, the model is not assembled before covering. We always lightly fix the various units together for photographs, then take them apart again. First step in preparing for a neat job is to thoroughly sand the frames to remove all flaws and roughness. Since only those members of the fuselage that run from nose to tail should touch the covering, it is best to sand the bulkheads to a slightly scalloped shape; this can be done with a pencil or other round object covered with fine sandpaper.



The finished Hawk P-40D, with all details of the full scale plane, is a fine flier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Colored tissue is used for all covering and decorations. Dull brown or olive with light blue undersurfaces is the usual color of Army fighters. Cover the wing first, using light dope or banana oil to stick the tissue to the frames. Wings are covered from the second rib to the tips. Attach only the extremities of the areas being covered. Incidentally, tips and similar curved parts require separate pieces to help avoid wrinkles. Tail surfaces are covered in the same manner as the wing. Since the fuselage is of a rounded cross-section, it is best to use many small pieces of tissue to prevent unsightly wrinkles from spoiling the job. The cowling and similar wood parts are tissue covered too. Lightly spray all covered parts with water, then pin the wing and tail surfaces to a flat surface to keep them from warping. Clear dope is not applied to the covering until the model is assembled.

The author followed this procedure to assemble his P-40D: First the wing is secured to the fuselage; if the frames have been made with accuracy, this is easy for they will fit together exactly. Secure the wing's position with plenty of cement. The structure shown under the wing in broken lines is next made. Formers are cut from 1/16" sheet to the shape shown and stringers are 1/16" sq. medium stock. Wing root pieces W-R, also cut from 1/16" thick balsa, are fitted from the wing's trailing edge to the fuselage. Since each model will vary a bit, it may be necessary to change the length of these pieces—this is also true of the 1/32" sheet wing fillets. Finish the wing-to-fuselage and under-the-wing details by covering with colored tissue to match the other covered parts. To set the stabilizer in position, the rear of the fuselage must be cut and then recemented; be sure to note the slight negative angle of the stabilizer. When cementing the stabilizer fast, off-set it about 1/16" for a right turn. Tissue fillets between the tail surfaces will enhance the appearance. Moisten any wrinkles and permit to dry before applying a coat of clear dope to the entire model.

The numerous minor details are finished next. Rubber tubing of the correct diameter is slipped over the wire landing gear struts and then painted black. Paint the wheels before placing them on the axles; washers soldered to the ends hold them in place. Covers which hide the undercarriage, when retracted, are made from balsa scraps—check photos of the model and real plane for more details. The cockpit enclosure is made from thin celluloid. It is best to make paper patterns before cutting the celluloid and be sure to avoid cement smears when gluing to place. Frame details of the cockpit are represented by thin strips of colored tissue doped to place. The stars, U.S. ARMY and similar details are made from colored tissue and the effort required in making them will be amply repaid by the snappy appearance they add to the model. Control surface outlines are represented by thin strips of black tissue doped to the surfaces. Addition of the tail wheel, exhaust ports, radiator detail, wheel wells and numerous other items will aid greatly in making your model more attractive without harming the flying ability. Naturally the propeller, nose block and any other uncolored parts should be painted to match the models covering.

FLYING—Eight to ten strands of 1/8" brown rubber will be needed to power our model "Hawk." Lubricate the rubber strands and then wipe off the excess to prevent splashing the fuselage sides. Hook one end of the loop of strands to the propeller shaft and drop the other ends through the body. It may be necessary to remove a small portion of the covering in the rear to aid in fitting the bamboo pin into position to hold the strands.

If possible, test hop your little pursuit over a grassy field on a calm day to keep from damaging it before necessary adjustments can be made. It is important that the glide is reasonably good before any power flights are attempted so try a few shoulder-height glides, adding weight to the nose or tail to obtain the desired smooth, flat descent. A few turns on the rubber motor can be tried once the glide seems okay. Minor adjustments can be made by slightly warping a wing tip or the tail surfaces but correction for serious misadjustments should be made at the nose plug. By off-setting the thrust line to the right or left, size of circles under power can be controlled and slight down-thrust will iron-out a stall. Gradually increase the number of turns making any further adjustments. For maximum flight performance, stretch the rubber and store up power by using a mechanical winder.

Exercise your best judgment in the building and flying of your "Hawk" P-40D and you will be rewarded with an attractive, fine performing model. Many hours of enjoyment are in store once the plane is completed.

VICTORY

Frontiers

(Continued from page 18)

wind tunnel model of a North American Aviation P-51 pursuit plane, the Mustang. Models similar to this are built of all newly developed airplanes to determine their flight characteristics before the actual ship is built. The test model is constructed with extreme accuracy and is suspended in the wind tunnel on delicate balances.

Air is then blown through the tunnel against the model at high speed, lift and drag being recorded on the balances outside the tunnel making it possible to predict top, landing and climbing speeds of all airplanes with only an infinitesimal small margin of error.

The picture shows the model being adjusted and prepared for testing by two skilled workmen at the North American Aviation plant. It is 1/4 actual size.

One of the greatest headaches in aeronautical designing is the propeller. It is the one instrument which is limiting the high speed that an airplane is possible to attain; a sort of "bottleneck" holding back high speed development. The power that may be transmitted efficiently by a propeller is limited because as speed of the blade tips increases efficiency drops; consequently propeller diameters are kept as small as possible. *(Turn to page 42)*

For Efficiency—Flo-Torque

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The tops in props.

INVADER DELUXE 25¢
Lacquer finished and balanced.

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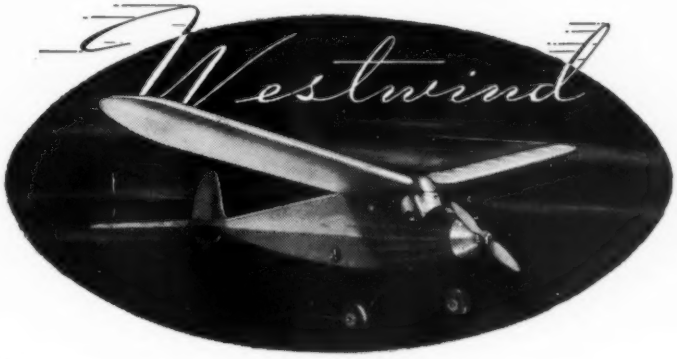

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LATEST WING SLOTS

For Class B or any small Class C Motor

A stable model to give super-satisfactory flying for the duration. A *Westwind* looks and acts like a modern hi-speed airplane, and will perform against the best of the pedestal type ships, without the hazard of whipstalls and spins. Slots smooth out climb and increase the glide. Model has refused to loop under any conditions. Kit is de luxe except for wooden wheels with plenty of dope, cement, covering, and all balsa or pine parts.

$3.85

WAR BIRDS U. S. ARMY AND NAVY LEADERS

GUARD IN THE ALEUTIANS

CONSOLIDATED PBY

While the headlines indicate that the Japs, have been having it all their own way in the North Pacific, the Navy's Consolidated PBY and the Army's Martin B26 have been taking a steady toll of Jap ships and are doing daily patrol work.

CONSOLIDATED PBY "Catalina" Bomber

Flying Scale Model, 1/4" to ft. **$1.95**

Add 15c postage

Two Army bombers that have covered themselves with well-deserved glory are the North American B25, raider of Tokyo, and the Boeing "Flying Fortress," backbone of the Army Bomber Force. Every modeler will want a souvenir of the ship that gave the Japs their first taste of U. S. daring and might.

NORTH AMERICAN B25

Solid Scale Model, 1/4" to ft. **$1.00**

Add 15c postage

BOEING FLYING FORTRESS

The Martin B-26 (below) has the reputation of being the world's fastest bomber and is an "aerodynamic whizz" super-streamlined and powered. Model is a SOLID SCALE model with processed parts, accurate plans, and full realistic details.

MARTIN B26

Solid Scale Model, 1/4" to ft. **$1.00**

Add 15c postage

It has just recently been announced that in the Coral Sea battle, the "Flying Fortresses" flew from Honolulu to Australia, bombing the Jap Fleet on the way, then turned around and bombed them again on the way back. What a ship! Boeings also did the main work at Midway.

BOEING B17 "Flying Fortress"

Flying Scale Model, 1/4" to ft. **$1.95**

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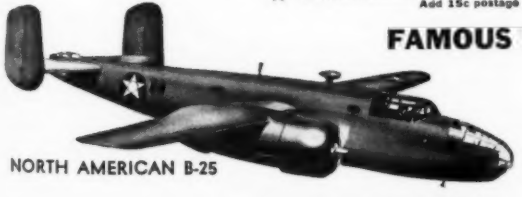
FAMOUS PACIFIC BOMBERS



NORTH AMERICAN B-25

MARTIN B-26

MODELCRAFT

SAVING BALSA

Hereafter Modelcraft Models will be supplied in sugar pine, which though slightly heavier than balsa, is very easy to carve. We are sure no modeler would want to feel he had cost some sailor or soldier his life because the balsa that should have been in the life-rafts and belts was in his model.

Largest Supply House in the West

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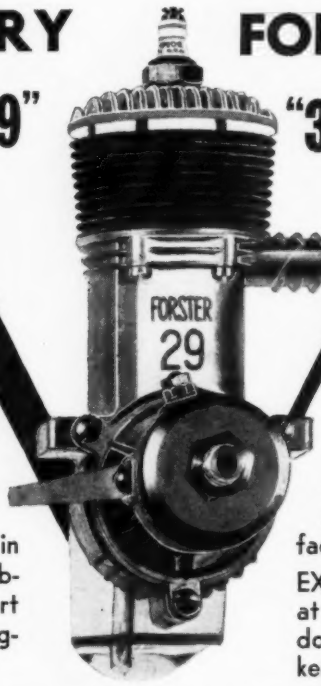
for VICTORY take care of your FORSTER

"29" "305"



Quality First!

Chicago, July 19,—"First" in "B" class,—First in "C" class, — and — a new World Record in "B" class, established by Robert Morgan, Birmingham, Ala.

Take good care of your "Forster,"—and when it does need repairs, send it to the factory for quick EXPERT SERVICE, at low cost. We'll do our part to keep them flying.

FORSTER BROTHERS

1415 Lake Street Melrose Park, Illinois

Another feature which is particularly undesirable both in commerce and war is the noise generated by the propeller. If this could be eliminated it would be practically impossible to hear an airplane flying overhead at a few thousand feet; most of the noise comes from the vibration of the revolving blades, not the engine.

In the past engineers have been up against a blank wall in working out some substitute for this vital flight factor. Consequently the development and successful flight of the new Italian Caproni-Campini C.C.1 jet-propulsion or "rocket" airplane shown in picture 3, is particularly significant. Many scientists have been working on the rocket idea and its application to aircraft for years. However to date this airplane has proved to be the most successful of many attempts, covering the 168 miles from Taleido to Linate Aerodrome, Guidonia, in 2 1/2 hours including a stop at Pisa. The ship was flown on December 1st, 1941 by Col. De Bernardi. Captain Pedace of the Regis Aeronautica and a small bag of mail were also carried on the trip. The average speed of the journey was not high, only about 130 mph., but no effort had been made to attain high speed as the ship was on a test flight.

The plane weighs 11,000 pd. and derives its propulsive effort from the high speed jet prop. The motor is located in the fuselage, air is driven in through the nose and expanded, then under pressure the air is driven out through a venturi at the rear, the air particles being suddenly impelled at high speed through the orifice. The air resistance to this sudden increase in its speed rearward exerts a tremendous and opposite force forward. The amount of air expelled can be controlled, thus regulating the driving power. The engine is used to drive the air compressor, the exhaust from which is also ejected through the jet with the propelling air.

This is a big step forward in aviation and we can predict it will not be many years before the airplane propeller as it is today will be a relic. In the future, planes with this type of power can be expected to fly 500 to 600 m.p.h. or more.

Few pictures have come from Russia giving details of Russian planes, so picture 4 is of interest. It shows Russian I-18 (M16-3) fighters lined up on a Russian airport being prepared for combat. In many respects they resemble the Curtiss P-40 with their long streamlined nose and short fuselage to the rear of the wing. These ships are highly efficient and have done excellent work in combating the Nazis. The planes shown in the picture are fighters built by workers of a Moscow aircraft factory and presented to the Red Army. They are powered with one 1200 hp. liquid-cooled engine, mount 6 machine guns and have a high speed of at least 370 m.p.h.

Another example of modern Russian planes is shown in picture 5. Here you see I-26 attack fighters taxiing out to the starting line. These ships prove excellent for ground strafing, mounting 2 cannons and 2 machine guns. Unlike the pursuit ships just described, the fuselage of these rearward of the wing is comparatively long.

Many will remember the mystery surrounding the Russian Airforce before the great conflict; all sorts of theories were heard and most of the critics believed it impossible for the Russians, with their limited experience, to produce efficient modern airplanes. Most of the pictures coming from Russia showed antiquated craft with angular lines.

Here you have a visible example of Russian ingenuity and highly efficient airplane design. Unlike the earlier Russian planes these are comparatively light and have given invaluable service in defending their country.

VICTORY

"Air Condition" Your Radio Control

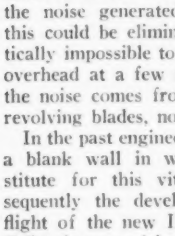
(Continued from page 19)

thus preventing the insulation from sliding back at embarrassing times. Another good scheme is to cement the long wires to the chassis or fuselage frame at two or three inch intervals to prevent them from whipping. A drop of colored dope at each end of a wire provides an easy method of color coding on complicated hookups.

A word of warning. Don't use acid core solder for your wiring jobs! No matter how good the joint, experience has shown that the acid will tend to eat through the copper in time, possibly with disastrous results.

While we're on the subject of soldering, we'd like to say that where batteries are concerned, we're against it. Even the most careful soldering job is bound to heat up the battery, decreasing its life materially if not actually ruining it. It doesn't ease the labors of replacing batteries on the field, either. The trouble is, though, that a satisfactory battery box is a hard thing to find. After experimenting with various pinchpenny substitutes, we finally decided to invest a few nickles in the commercial duraluminum type, and our troubles were over. We might suggest, however, that splitting the ends of these cases vertically gives better results since it allows each of the two batteries to expand or vibrate as it pleases, without regard to the antics of its bedfellow, and insures constant contact.

We have found that using several small batteries in parallel is less economical and more cumbersome than using larger ones. A penlight cell, the smallest kind, weighs about 5/8 of an ounce, the next size larger weighs 1-1/2 ounces, and the largest size flashlight cell 3 ounces. The



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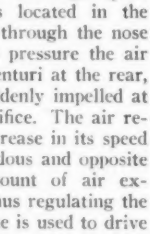

Dealers Wanted

ACE MODEL PLANE CO.

3149-M Shenandoah St. Louis, Mo.

life and capacity of the battery increases more than proportionally to its size, so that the larger sizes are the more economical and dependable.

Assuming that they are fresh, the batteries having the longest shelf life will check the lowest when tested with an ammeter; while the cheaper kinds of batteries, which are most suitable for radio control purposes, deliver a higher current but have a much shorter shelf life. It is therefore advisable to check such batteries with an ammeter before purchasing them, in order to be sure of their freshness. When testing a battery hold the ammeter on it for only an instant, so as not to damage it. A high reading for a penlight cell in good condition is four amperes, for an intermediate cell, six, and a good large size cell will deliver between eight and ten amperes when fresh. These figures are for short shelf life batteries.

There are a large number of light weight B batteries, made by various manufacturers, but in these days of priorities not all of them are readily obtainable. Fortunately, however, Burgess makes an excellent battery for the purpose, the XX-45. It is always available, since it is designed for use in the popular small portable receivers, and its price is very reasonable. It comes as a 67-1/2 volt battery, but tearing off the cover reveals that it is built in three neat sections, connected by jumpers. Two of these sections will deliver 45 volts and weigh 6-1/4 ounces. Since they are rectangular they can easily be mounted in a balsa box or framework, and leads can be soldered to the jumper terminals. The life of a B battery can be very much prolonged by keeping it in the refrigerator when not in use.

There are two types of receivers suitable for radio control work, one using a type 30 tube, the other using the RK-62. The chief advantage of the 30 receiver is the low cost of the tube. The RK-62 receiver is easier to build and more reliable. It requires far less adjustment and usually works at once, while a certain amount of tinkering is almost invariably necessary before the 30 receiver will function properly.

The original circuit for the RK-62 receiver, as shown in Fig. 1, will operate satisfactorily with the least amount of preliminary piddling. To obtain best performance from the tube it is a good idea to follow the manufacturer's specifications. It is not advisable to operate the filament at more than 1-1/2 volts, and it is not necessary to do so. A single penlight cell is quite satisfactory for filament supply. It ought to be checked occasionally to make sure that it is not deteriorating. Although somewhat heavier in weight, the midget type air tuned condenser is much more satisfactory than the mica tuned type, since it is easier to adjust and less subject to vibration and temperature change.

The value of the grid leak, R_1, may vary with the individual receiver. Larger values of R_1 will yield a greater dip in plate current, but as the resistance increases, a point will be reached where the time lag in tube response becomes too great. It is advisable to start with a value of about one megohm and add resistance

America's LOWEST PRICE Large Size

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Famous MARTIN MARYLAND

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AND GET 'EM FLYING QUICKER

Save one-third building and assembly time. Now Ott-O-Former time-and-labor-saving wing ribs (ready cut ribs) as well as fuselage formers.

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Each 75¢

AT GOOD DEALERS EVERYWHERE: Go to your neighborhood variety, school or hobby store, department or chain stores. See these new bombers and other OTT-O-FORMER MODELS. If ordered direct add 25 cents for postage and packing. Catalog and favorite plan 5 cents.

Joe Ott MANUFACTURING CO.

415 W. SUPERIOR ST. CHICAGO, ILL.

in series until reliable operation is obtained. The volume control, R_2, used as a plate resistor, can be replaced by a small fixed resistor chosen to give the maximum rated plate current of 1.7 mills. The variable type resistor, while slightly heavier, has the advantage of permitting the plate current to be maintained at the optimum point as the B battery deteriorates.

The receiver circuit shown in Fig. 2 is similar to that in Fig. 1, except that it employs a doublet resonant antenna with inductive coupling. One half of the doublet antenna can be mounted in each wing. The total length of the antenna is given by the simplified formula

$$L = \frac{492}{F}$$

where L is the length in feet and F the frequency in megacycles. If this is less than the wing span, "feelers" of 1/32" (No. 13) piano wire, protruding from the wing tips, can be used to extend the antenna. For best results the antenna wire should be kept as straight as possible.

The tuned circuit shown in Fig. 2 requires some cut and try work, but it is much more sensitive to weak signals. Each side of the primary coil, L_1, goes directly to the antenna. This coil is composed of approximately seven turns, but the exact number of turns can only be found by experiment. Disconnect the antenna and insert a low range milliammeter into the plate circuit. Then tune across the band with the variable condenser. A section of the band will be found in which the plate current dips to a minimum, indicating that the tube is not oscillating. When the antenna is reconnected (test with the antenna to be used in the plane) the tube will begin to oscillate in a part of the band in which it had not oscillated without the antenna. This latter oscillation range is the range of greatest sensitivity of the receiver. The number of turns on L_1 should now be changed until this sensitive point on the band corresponds to the resonant frequency of the antenna. The exact number of turns can be found by the cut and try process.

A simple self-excited transmitter is sufficiently flexible to permit its being turned to the sensitive point of the receiver with little difficulty, and its operating characteristics are quite satisfactory for radio control work. We have found that a crystal controlled five meter transmitter is very unreliable, since it often fails to go into oscillation.

The small oscillator shown in Fig. 3 is a handy aid to checking receiver performance. Without an antenna this oscillator should operate the receiver reliably at a distance of about 200 feet.

If the receiver unit is properly constructed and adjusted it should be quite trouble free. Occasionally, however, interference of one kind or another may cause difficulties. Ignition, as a rule, causes no trouble. If it does, the ignition condenser is probably at fault and a larger one—about 1 mfd.—should be substituted. If the ignition condenser is not of the metal case type, be sure that the end marked "outside foil" goes to the engine crankcase. Keep the condenser as close as possible to the breaker points, and keep all leads short.

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INTERSTATE CADET — National Flying Scale Champion

This 35" beauty averaged 2 minutes 38 second flights at the 1941 Nationals, and has been frequently timed in flights of over four minutes with all accessories, as pictured. A sure winner, regardless of competition! Kit contains 8 metal fittings, 8 form wire parts, special folding propeller, rubber tensioner, metal radiator grille, decal numerals, insignia and stripping, 33 x 44 full size plans, phantom drawings, wooden parts printed out, wheels, cement, and silkspan (less rubber).

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$1.50 P.P.

BUCCANEER "B" SPECIAL

56" WINGSPAN

A breath taking performer, based on scientific principles resulting from the latest N.A.C.A. Wind Tunnel Tests. Provides the ultimate in safe, stable performance, without whipstalls or spins due to improper adjustment. Power it with any Class "B" or small Class "C" engine. Kit includes finished propeller, rubber wheels, formed landing gear.

Stall Proof Slotted Wings!

Spin-Arresting Tail!

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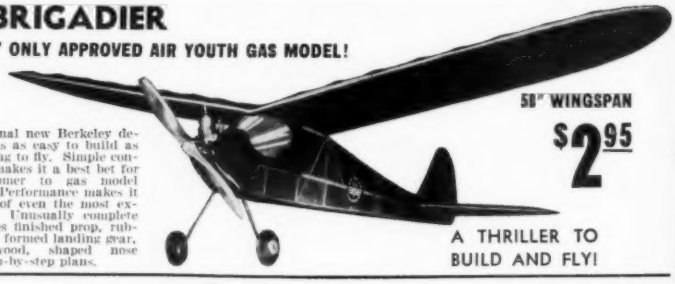
BUCCANEER "C" SPECIAL. This 6 foot wingspan, 3 lb. model incorporates the same outstanding features of the "B," and is available in choice of sport wing, or high performance polyhedral wing. Built for rugged durability and highest strength-weight ratio. Kit includes dope, formed wire landing gear, rubber wheels, and finished propeller. $6.95 p.p.

BRIGADIER

Class "B" ONLY APPROVED AIR YOUTH GAS MODEL!



A sensational new Berkeley design that is as easy to build as it is exciting to fly. Simple construction makes it a best bet for the newcomer to gas model building. Performance makes it a favorite of even the most experienced! Unusually complete kit includes finished prop, rubber wheels, formed landing gear, printed wood, shaped nose blocks, step-by-step plans.

58" WINGSPAN

$2.95

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Each kit includes cut-to-outline fuselage and wings, full color decal insignia, model cement, turned wheels, blanked hardwood propellers, celluloid for cockpit enclosures!

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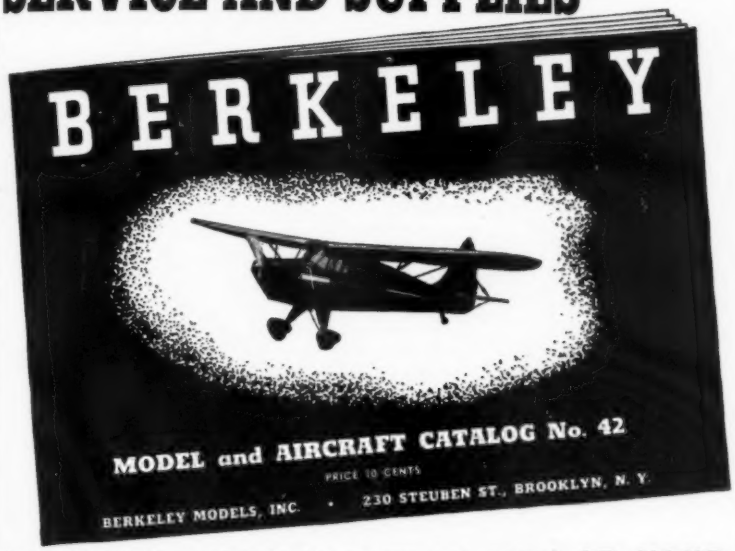

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BROWN CONTEST RUBBER

1/16"	25 ft. for	15c
1/8"	20 ft. for	15c
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Rubber Lubricant	2 oz.	25c

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Control Wire, 200 ft. coil, .010 dia.... 65c
Hi-Ball Props 10", 11" & 12" sizes.
Plain Finished..... 20c
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Complete data and catalog of special equipment..... 25c P.P.

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ROGERS MOTORS

With molded V-alloy cylinder & piston, oil-proof timer unit, complete with coil and condenser.
RMC-2 .29 inch displacement..... $ 9.75
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ENGINE REPLACEMENT PARTS

Put your old engine in tip-top condition yourself. We have replacement parts in stock for the following motors:

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Not to be confused with paint! Actual reproduction of camouflage used on our fighting aircraft. Four standard colors:

Medium Green Neutral Gray		Olive Green Night Black	
1 oz.	10c	2 oz.	15c
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U. S. Coil	
Smith Competitor Coil	$1.50
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Mechanical Timer, Steel	40c
Mechanical Timer, Dural	1.75
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Cut Battery Costs 60%. Use two to six Cells. All plastic Construction. Perfect for weight rule contests and balancing model..... $1.25 P.P.

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2 1/2" Sponge Rubber Wheel	pr. 40c
3 1/2" Sponge Rubber Wheel	pr. 45c
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Surgically keen X-acto knives. Make cutting easier, faster, truer. Blades instantly changeable.

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Occasionally, where electric motors are used to actuate controls, commutator arc may be the cause of receiver interference. Since the RK-62 is at maximum sensitivity just after a signal is received, a slight disturbance such as the arc at the commutator may cause the receiver to remain out of oscillation after the carrier goes off, so that the motor keeps on running. This type of interference is particularly troublesome since it is extremely hard to diagnose. The cure is to shorten and twist the motor leads. If this fails, or if the motor leads cannot be shortened, a sure cure is to put an RF choke in each lead and a .01 (200 volt) condenser across the leads—all as close to the brushes as possible. The RF chokes are made of No. 24 D.C.C. wire, closely wound over a 1/4 inch dowel for about two inches. Pull the coil off the dowel and give it a couple of coats of cement, holding the ends until the cement dries, so as to keep the turns from spreading apart.

Atmospheric interference is seldom a problem, especially since radio controlled models are not usually flown in thunderstorms. The only other kind of interference is that due to other transmitters. There is no complete solution to this problem, but the chances for interference can be lessened by arranging the control system so that the carrier will normally be on at all times and the breaks will be keyed, instead of the usual system of keeping the carrier off and keying it on. This requires that the relay be adjusted so that the circuit is open when the carrier is on.

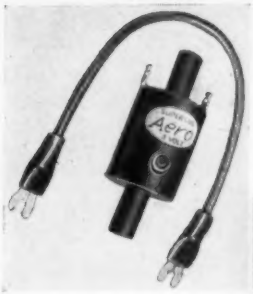
In conclusion, we might mention one other kind of man-made interference—the interference of the law. This can be avoided either by having a radio amateur's license yourself or by getting together with someone who has one. We suggest the latter method as the better, since radio control is really not a one man job, and the "ham" will usually have some worth while ideas or suggestions just when they're needed most. And when are good ideas *not* needed in radio control work?

PARTS LIST

R_1—See text.
R_2—10,000 ohm variable resistor, adjusted to give 1.7 milliamperes plate current.
R_3—100,000 ohms.
C_1—30 mmf. mica dielectric variable condenser.
C_2—10 mmf. air tuned variable condenser (Hammarlund APC-25, cut to three plates).
C_3—.0001 mfd. mica.
C_4—.25 mfd. paper.
C_5—35 mmf. air tuned variable condenser (Hammarlund MC-35-S).
C_6—.0001 mfd. mica.
C_7—.01 mfd. mica.
RFC—Ultra-high-frequency RF choke, such as Ohmite Z-1.
L_1—See text. Approximately 7 turns No. 16 bare copper wire spaced 1 3/8 in. long, wound on 1/4 in. form. Cemented inside of L_2 with clear model airplane cement.
L_2—13 turns No. 16 bare copper wire, wound on 7/16 in. form, 1 1/2 in. long.
L_3 and L_4—5 turns No. 16 bare copper

AMERICA'S FINEST
IGNITION EQUIPMENT
FOR THE U. S. ARMY—AND FOR YOU

Aero ignition has been tested and accepted by both the Army and the Navy, and is now employed in Military Aircraft, Fire Control, and other various secret military devices. It costs no more to equip your model with Aero Ignition.



AERO FEATHERWEIGHT $2.25
America's lightest, most efficient spark coil. Standard equipment of the finest model engines. 3 volt operation. Weighs 1½ oz.

AERO RACER $2.50
The fastest coil in the world. Steady spark at 15,000 r.p.m. Designed specially for race cars and speed boats. 3 volt operation. Weighs 3 oz.

AERO SUPER $2.25
Lightning Start, Low Battery Drain, Peak Performance, Starts and Operates on Two Pen-Cells. Weighs 2¼ oz.

Hi-Tension Lead Wire 15c *Matched Metal Case Condenser* 25c
Ask your dealer to show you the complete Aero line—today.

AT BETTER HOBBY DEALERS
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wire wound on 1/2 in. form, each coil 1/2 in. long, with 5/8 in. space between coils. Extremities of the two coils are mounted directly to the plate and grid terminals on the tube socket. L_6—2 turns antenna link placed between L_3 and L_4. Ordinary hookup wire.

VICTORY

The Searanger

(Continued from page 21)

is of all-metal construction with a straight trailing edge and an acute sweep-back angle on the leading edge similar to the Douglas DC-3 commercial type. Two large pontoons are located out near the tip to aid in lateral stability in take-off and landing or taxiing on water. These pontoons are fixed and are supported forward of the wing by a heavy cantilever beam well faired in at its upper end at the wing and its lower end along the top of the pontoon.

The tail surfaces are of the full cantilever single surface type and the vertical stabilizer has a long, sloping contour to aid in directional stability. The rudder is fabric covered and is balanced dynamically and statically as well as acrodynamically through the use of controllable trim tabs. The horizontal stabilizer is built up on a full cantilever beam and the elevators are of similar construction to that of the rudder.

Although no details have been released the Sea Ranger is believed to carry a huge load of either bombs or torpedoes useful in action against ships or installations of the enemy. Such a load would be carried internally which would necessitate the use of bomb doors opening in the bottom of the hull being water-tight sealed in the closed position.

According to "Ships and Aircraft," the Boeing XPBB-1, as it is known technically by the Navy, is powered by two Wright XR-3350 engines, new type radial air-cooled designs developed by the Wright company which appear to be a full 18-cylinder Double Cyclone type. Horsepower stated is 2,000 per engine giving the Sea Ranger a total power of 4,000 horespower. These engines are located in small, streamlined nacelles in the leading edge of the inner wing panel with the engine mounts bolted to the main front spar. They are completely enclosed in long chord cowlings and are provided with cooling cowl flaps for use on the water or during long climbs. The exhaust manifolds terminate in flush openings high on the cowl skirts to carry the exhaust gases over the top surface of the wing and away from the cabin.

The main entrance hatch is located on the port side of the bow through which the members of the crew and passengers enter. In addition emergency escape hatches are located throughout the hull to provide instantaneous exist in the event of fire or the inevitability of a crash landing.

Complete radio transmitting and receiving equipmnt is carried together with flight and navigation instruments, power plant instruments, in the Flight Engineer's office. Among the many items of sea gear carried are beaching gear, sea anchors, smoke bombs for drift indicating, emergency rations, signal flares, mooring cleats, quickly inflatable life-rafts, oars, and a myriad other items to be used at sea in the event of damage to the ship. The hull is so designed that the Sea Ranger could remain afloat for many weeks without fear of being pounded to pieces and complete living accomodations are provided for an indefinite foray at sea.

The Boeing Sea Ranger is one of the most formidable ships of its type yet constructed and its high speed, climb and range make it a mighty weapon of warfare against the Navies of the enmy. The ship is still very much on the restricted list and the Navy Department has not released any information on details of its performance, weight or loading, armament or installed equipment nor will they permit the publication of any such information. From this we can gather that the Navy is banking a lot on the Sea Ranger in the coming battle for freedom and wants it kept "hush-hush" until such time as it can strike a blow at the enemy.

It will undoubtedly join the anti-submarine patrol immediately upon being received into service and it can confidently be stated that production deliveries of the type will be made pending completion of flight tests and the tooling up of the vast Seattle plant for production of this giant.

Build A Model Searanger

The clean, rakish lines of the Sea Ranger make it an ideal type for a solid scale model. Get over-all dimensions from the plans. The wing may be cut from one solid piece joined to the fuselage in a cutout or cut in two large panels and cemented to the fuselage. The latter method is to be preferred due to the dihedral angle of the wing. Take a piece of flat balsa or pine stock cut to required over-all dimensions and trace the planform of the wing. Cut this out with a band or handsaw. Take a good whittling knife and carve away the trailing edge of the wing to a rough airfoil contour. Select a heavy, rough grade of sandpaper and sand the wing to the approximate airfoil contour. Take a smoother grade of sandpaper and sand the wing to the exact contour. Now fit the wing silhouette template and use a still finer grade of sandpaper to smooth out the wing to the exact wing contour taking pains particularly at the tips. Draw in the aileron and flap outlines with India ink after spraying the surface with the required camouflage color.

Cut the rough hull outline from a solid block of balsa and trace the side-view profile of the hull on the block. With a band or handsaw cut this to a rough shape. Now trace the top-view contour of the hull and repeat. With the whittling knife, cut away the lower portion of the hull to the required "V" shape and make the machine-gun turret cut-outs as required. With a rough grade of sandpaper, sand the hull to the required shape. Cut out the silhouette templates and place them a fine grade of sandpaper, sand the hull to the required cross section. Make the neces-

The BROOKLYN DODGER
DOUBLE WINNER

SAL TAIBI'S
NEWEST
CHAMP AT SKYSCRAPER & TRI-CITY MEETS, VA.
A sure first-place Pennant Winner in either Class "B" or "C" competition. Newest of Sal Taibi's gas sensations. Plane has attracted so much attention with its astounding feat of 2 "firsts" inside of one week. AIR TRAILS lost no time in featuring this Double Champion on a double-page spread. Taibi's innovation of design will enable even a beginner to construct a gas model in record time.
CLASS "B" AND "C" WINGSPAN 56"

$3.95 POSTPAID

COMPLETE KIT (Except motor) Stream-lite Wheels, Detailed Full-size Plans, Silkspan Covering, Finished Prop, Formed Landing Gear, Printed Wood, Liquids, Dope Cement.

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Write for special discount on the entire H & F Flying Line.

POLK'S NEW SLOGAN Conserve and SAVE

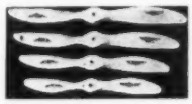
BUY WAR STAMPS

SUPER DETAIL **JEEP**

MOVING WHEELS and WINDSHIELD

Build this realistic, U. S. ARMY JEEP!—the "baby" all purpose speedster which popularized the mechanized branch of the service. Compact kit contains easy-to-follow, full size plans with all parts cut to size, all hardware, metal parts, springs, etc. included as well as turned wheels.

60c BY MAIL 70c



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Reproductions (up to 7 colors!) ARMY & NAVY designs, also British, Netherlands, Japanese, German, Italian. Soak 'em, slide 'em, stick 'em!

12—3" Decals	10c
12—1½" Decals	15c

10c With 2-edge blade

ALL METAL UTILITY KNIFE
2-edge blade refills in a jiffy! Can't slip!

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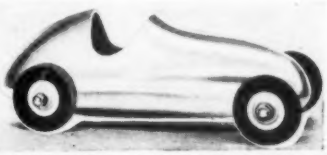

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A trim cabin job—ideal for beginners and contest work! 35" wing-span—weighs 4½ ozs. Complete BALSA kit with many extras.

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WAHOO

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BUCKAROO

37" wingspan, 180 sq. in area, weighs 5 oz. Most popular "buck" gas job AND STILL A BUCK! Especially adapted for beginners. Simplified, full size plans. (By mail, add 15c) **$1.00**

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MOVABLE *Control* SURFACES

Sensational kit values! These are quality F-L-Y-I-N-G Models with READI-CUT Ribs and movable control surfaces. Each kit includes crystal clear, LIFE SIZE plans with best materials. 25" spans. Choice of SPITFIRE, VOUGHT SIKORSKY, BELL AIRCOBRA, CURTISS DIVE BOMBER. 4 for $1 for the set. Individually 25c (by mail 35c).

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25" WING SPAN

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REPLACEMENT PARTS - REPAIRS
For All Gas Engines

1942 Super ATOM
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Authorized factory distributors AND SERVICE STATION for leading engines. Top CASH VALUE trade in allowances on old motors towards purchase of a new one.

Super ATOM	$15.50
OHLSSON "19"	16.00
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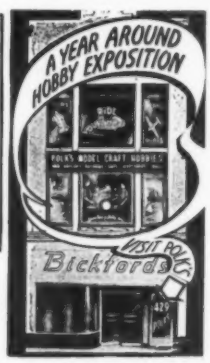

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sary cutouts for the pilot's cabin, turrets, windows, etc., and spray on a camouflage color of green, brown or whatever colors you may select. Leave a wavy pattern of the camouflage paint along the side of the hull. From this wavy line down to the keel spray on several coats of light sky blue paint and let dry. Paint in the windows and other required black markings. The turrets may be made from balsa blocks carved to a smooth spherical shape with their lower sides sawed off in a flat section. Cement these in place as required. India ink lines may be made on the turrets to give them a realistic appearance or cellophane may be cemented in at the required transparent panel locations.

Cut the tail surfaces from flat balsa sheet stock, sand to contour and spray as required with the lower surfaces of the horizontal stabilizers and elevators a light sky blue. Cement in place.

Cut the pontoons to shape and attach with flat sheet stock cut to length. Fillets may be made from cement and sawdust or finely ground meal and moulded into place.

The engines nacelles are carved into a circular section with appropriate markings for the cowl flaps. Cut the propellers from three individual pieces cemented at the hub and painted black throughout.

After painting and assembly, the entire model should be given a spray coat of clear lacquer to preserve the finish.

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VICTORY

Model Amphibian Sportsman

(Continued from page 13)

Laminating may be necessary if you are not able to obtain sheet wide enough to make the bulkheads in one piece. Take care in laying out the holes through which the main spars pass as the entire alignment of the model depends on their accuracy. The bulkheads are now slipped in their respective positions on the five main-spars and glued securely. Cut the motor nascelle formers in the same manner and of the same material as the fuselage bulkheads. Fit them in position on two 1/8" by 1/4" main-spars and glue the unit to the fuselage frame. Formers N2 and N4 will fit against bulkheads F4 and F5 and should be glued to them securely.

The motor mount bearers may be cut from any hard wood and should be coated with glue or dope to keep oil and gasoline from penetrating and rotting the wood. As is the case with most models you will not be replacing the mount as breakage is almost an impossibility. As described on the plans, extra braces of 1/4" square balsa are made to frame the motor bearers and give them added strength.

Cut the nose of the hull from a solid piece of medium balsa and glue it to F1. The most satisfactory way of assuring yourself of a well shaped fuselage is to let this solid block remain in a large semi-shaped form until the stringers are laid.

Tail surface construction of this model is somewhat out of the ordinary and, therefore, you should follow the layout on the plans as closely as possible. Begin by cutting a 1/4" hole in the main-spar and inserting the rudder post. Make certain the post forms a 90 degree angle on all sides and that it is well glued. Next cut the rounded tip and trailing edge from soft 1/4" sheet wood and fit the tip on the rudder post. The leading and trailing edges are now glued in place and held with pins until dry. Too much importance can never be placed on the necessity for perfect rudder alignment. At this point double check your work and see that it is 100 per cent. You are now ready to place the 1/8" by 1/4" balsa strips on the outsides of the rudder post and to also place the 1/4" square diagonal brace. These three pieces form an airfoil and also serve to strengthen the rudder. Ribs are 1/8" by 1/4" and lay flat with their wide side against the post.

Stabilizer construction is identical to that of the rudder with but two exceptions. These being the size of the main-spar as compared with that of the rudder post and also the omission of a stub-trailing edge.

Incidence on both surfaces is zero degrees. Any control needed is handled by the small tab shown on the plans. Two small strips of aluminum or soft wire hold the tab in place and make it moveable.

Full details for the landing gear are shown on the plans. Possibly you will want to add a few extra braces of your own design. Such braces are not completely necessary, however, should you desire to fly the model as a land plane exclusively, they

might prove useful. The spars to which the tubing is spliced are both 1/2" square hard balsa. Incidentally, the tubing may be either aluminum, copper or brass, preferably either of the latter two as they are hard and do not bend so readily. Wire for the landing gear is 1/8" steel, the separate parts being held together by fine wire splicing and solder. The gear may be held more firmly in the tubing by crossing several rubber bands under the hull and wrapping the around the lower part of the two units. The bands will not show and they are easily removed.

Using the full size pattern on the plan, cut two ribs of 1/4" balsa and the remaining four from 1/16" sheet. The wing stub is constructed as a unit and then glued securely to the two top main-spars of the fuselage. Allowance should be made for 1/8" positive incidence. The aluminum tubing required for the wing mount is placed in position where indicated and held by tightly wound thread and cement. Sheet wood covering is applied to the top of the stub only and will form a perfect fairing if laid according to the diagram.

Laying the stringers of this model is a simple matter, as the five main-spars hold the formers intact and in line. Start by laying four stringers; one on the top, the bottom and each side, then work from side to side until the job is finished. Wood for the stringers is 1/8" by 1/4" medium balsa and they are spaced 1/2" apart on all four sides of the fuselage. The pilot cabin is now ready to construct and you will find complete details on the plans. First cut the rounded piece forming the roof from 1/8" sheet and glue it in place against former F4. Next the braces which form the windows are placed and will add strength to the cabin. Rounded edges are formed on the cabin roof from soft 1/2" square balsa.

Before laying the stringers necessary to shape the motor nascelle it is advisable to mount the motor. Notice the plans call for an inverted motor only. The test model used both inverted and upright installation and the upright mount showed slight spiral instability when in a gliding turn. When inverted there was no sign of instability of any kind. Coil, timer and condenser locations are only suggestions and do not necessarily need be followed. Keep these units close to the indicated locations, however, as the weights are necessary to balance the model. Any of the standard 13" or 14" propellers will give satisfactory results when used with a 1/5 or 1/4 horsepower motor. Though never tested on the original model, a 1/6 horsepower motor should prove powerful enough for R O G flying. However, some difficulty may be encountered in taking off the water with one of these smaller motors.

After mounting the motor the 1/8" square stringers are laid 3/8" apart over the entire area of the nascelle.

Covering of the model is optional with the builder. However, one way that has proven highly satisfactory is to cover the fuselage bottom with 1/16" sheet plus a covering of silk and the remainder of the model with silk. In the event you are not expert at covering, or you wish something less expensive, a tough grade bamboo paper might be substituted. For the modeler who would like an exceptionally smooth

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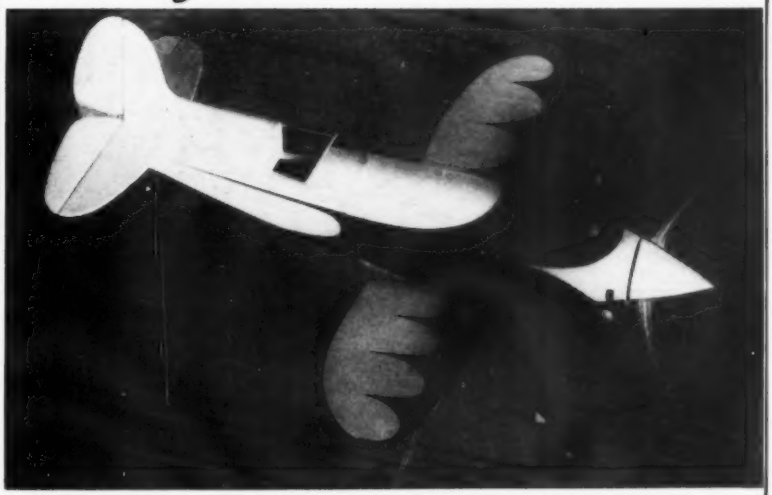

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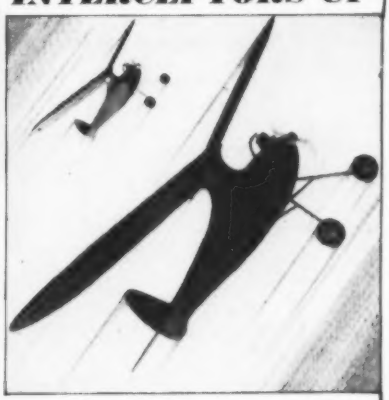

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job, the whole fuselage might be covered with sheet and then made punctureproof with an added covering of silk or bamboo paper. In the event you should choose this latter method it will not be necessary to space the stringers so close.

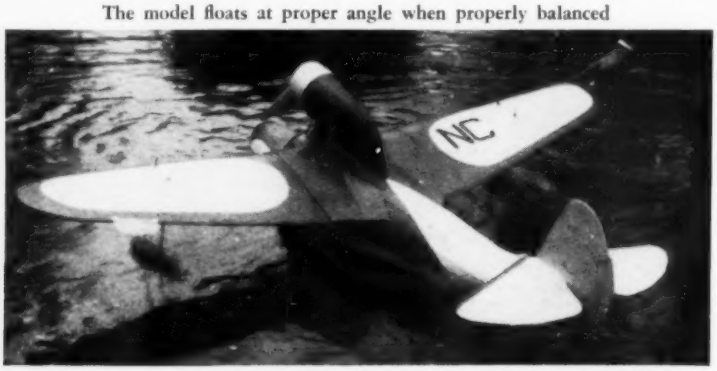
The wing diagram describes the left panel only. Using the same dimensions and a little imagination the right panel may be made without drawing a full sized layout. No plotting of curves for the airfoil of this model is necessary. Simply use the full size rib patterns and cut two ribs of each size. Rib One is cut from 1/4" sheet balsa and the remaining eleven are 1/16" balsa. Slots are cut where indicated to accommodate the leading and trailing edges and also the three 1/4" spars. These three spars extend only as far as rib Eleven and, therefore, no slots are necessary in rib Twelve. Wing tips are easily made by doubling the half-size pattern on Plate Four.

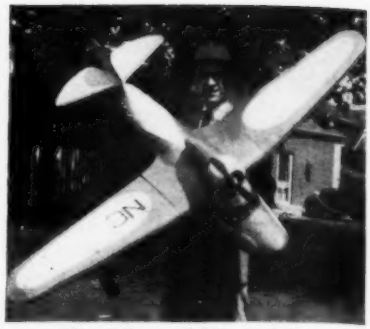
Possibly you will want to test glide your model by running along the shore and launching the plane out into the river or lake for a water landing. If such is the case it will be necessary to reinforce rib No. 7 by adding several extra spars between ribs 6 and 8. Use 1/8" square hard balsa. This will strengthen the outboard motor mounts and therefore lessen the risk of damage due to a high speed water landing after hand launching.

Before applying the sheet wood and cap strips make the wing mount in six pieces from 1/8" steel wire, and after bending to form the dihedral of the wing, splice them to the wing spars where indicated. Bits of solder spread along the outer edges of the wires will roughen them and cause the glue to hold more firmly.

Sheet wood and cap strips are applied to

The model floats at proper angle when properly balanced





The author and his amphibian

the top of the wing only and should be well sanded to insure a smooth covering job. The pontoon mount is clearly described on the plans and should be followed exactly, as it will prove as efficient as it is simple. Using the same method as you did in constructing the fuselage, cut the formers from 1/16" sheet and glue them in position on the main-spar. Cut the nose and tail blocks from a very soft grade balsa, and after shaping and sanding, hollow them until the walls are about 3/32" thick. Coat hanger wire is entirely satisfactory for the struts and you will find the whole unit surprisingly light. Cover the pontoons with silk or bamboo paper just as you did the other parts of the model.

You should have no difficulty in constructing a suitable cowling for this airplane, as the full-size formers are shown on Plate Five and a complete outline of the stages of construction are found on Plate Six. Build the skeleton frame using 1/4" square balsa between formers C4 and C5 and cover with 1/4" sheet. After rounding with a knife, sand the cowling smooth and apply a covering of silk or bamboo paper.

Adjusting and flying the model should be planned as carefully as you did the actual construction. If you are fortunate enough to have a large body of water nearby, test the model as a seaplane first.

With the landing gear in place try a series of hand-glides until you get smooth, steady ascensions. Now remove the gear and fly the model R O W with the motor revving about one-half speed. Gradually increase the power as you feel out the flight characteristics. Slight thrust adjustments, right or left, and adjustments of the rudder tab will give the ship proper turn in flight. Use modeling clay for weight adjustment in the nose or tail of the model.

If it is necessary for you to make your test flights from a flying field, glide the model in the same manner as above and then launch it for a series of power glides. These will be made with the motor barely "ticking over." Increase the number of propeller revolutions and adjust.

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Air Youth

(Continued from page 22)

ington headquarters for the past three years, and previous to that time he was an N.A.A. junior representative in the New England area and past president of the Academy of Model Aeronautics.

Hambrook Honored by Exchange Club

Dr. Robert W. Hambrook, senior specialist, U.S. Office of Education, and a member of the N.A.A. Air Youth Board, was guest of honor recently at a dinner in Toledo, sponsored by the Exchange Clubs of the Toledo area.

Speaking on the importance of model aviation to the war efforts of America, Dr. Hambrook described a visit to England not long ago on which he studied aviation training programs.

Dr. Hambrook received an honorary membership in the Exchange Club of Auburndale-Toledo (Ohio). Among those present were Harold M. Harter, national secretary of the Exchange Club, and Maurice Roddy, aviation editor of the Chicago Times—both members of the N.A.A. Air Youth Board. Other model aero leaders in attendance were Steve Corbett of Detroit and Raymond A. Humphreys, Sr., president of the Toledo chapter of the Academy of Model Aeronautics.

Exchange Convention Off; Model Meet Cancelled

The National Exchange Club has called off its 1942 national convention as a patriotic gesture in response to a directive issued by the Office of Defense Transportation. This means that the annual aeromodeling contest conducted in conjunction with the convention will not be held this year or for the remainder of the war period.

The yearly competitions have attracted much attention, being sponsored by the host Exchange Club in the city in which the large gatherings were held. Last year, the N.A.A. Academy of Model Aeronautics granted an AAA rating to the model aero contest held at Richmond, Va., and sponsored by the Richmond Exchange Club.

This year's convention and Exchange contest had been scheduled for Cleveland. Although the meet will not be held, Exchange headquarters is urging local Exchange clubs throughout the country to sponsor city-wide and inter-club aeromodeling contests.

J.A.R. Texts "In the Works"

Soon ready for distribution will be the official Air Youth texts on all phases of aviation, prepared in handy, workshect form. These leaflets, created specially for the Junior Air Reserve, will be issued regularly after the first several dozen are off the presses.

A group of staff workers has been busy in New York City during the past several months assembling, editing, and preparing material for these air youth booklets. School teachers and activity leaders who have had the opportunity to inspect the material have been quick to say it is in very usable form for classroom and club work.

Richard S. Robbins of the Royal Canadian Air Force, who has been on leave to head up this N.A.A. project, has announced that with the completion of the first series of bulletins and the setting up of an outline for successive leaflets, he will return to Canada and go on active duty with the R.C.A.F.

J.A.R. Official "Hats" Arrive

After an extensive wait for materials, several thousand Junior Air Reserve hats have arrived at headquarters for distribution. Already many have been sent out to Flights and Squadrons waiting for them.

The hats are available in small, medium and large sizes. Information on head size and costs may be obtained from J.A.R. headquarters. The hats are made of khaki twill, and look much like regular Army overseas hats, except that the J.A.R. hats have a bright blue beading and the official Reserve emblem on their left front side.

Girl Scouts Training Program

As part of her work as National Wing Commander for girls in the Junior Air Reserve, Mrs. Harry T. Jordan of Philadelphia sponsored and supervised last month a two weeks' training course for the Girl Scout leaders in air youth work.

A feature of the course, which included 12 hours a day of intensive study, lectures, model building and flying, was a trip to Baltimore by the students for a trip through the Glenn L. Martin aircraft plant.

Mrs. Jordan has been appointed special liaison officer by Girl Scout headquarters to coordinate the formation of Girl Scout Flights in the Junior Air Reserve. To aid in her air youth activities, Mrs. Jordan recently acquired a Stinson which she has been flying between New York, Philadelphia, and Washington.

Appearing before the Girl Scout training course was Mrs. Clarence Norton Goodwin, chairman of the Women's Auxiliary of Air Youth (W.A.A.Y.). At the conclusion of the two weeks school, and upon satisfactorily passing all the requirements, the leaders attending the Philadelphia sessions were awarded diplomas by national headquarters of the Girl Scouts.

General Arnold Sees Junior Air Reserve of Great Help

Lieut. Gen. H. H. Arnold, commanding general of the U.S. Army Air Forces, has placed his stamp of approval on the N.A.A. Junior Air Reserve as the type of activity needed in America's military program.

In a letter to William P. Redding, executive vice president of N.A.A., Gen. Arnold, an old N.A.A. member, wrote:

"I heartily concur in your air training program for youth. It is certainly essential that our youth be given an opportunity at an early age to become acquainted with the basic principles and fundamental significance of modern aviation. Such activities will be especially helpful in conjunction with the high school "air-conditioning" program which, in turn, is expected to dovetail with the essential needs of military aviation. Boys you are training today will be America's sky warriors tomorrow.

"The Friday night network radio program (Squadron Scramble) is another fine idea, and you may be sure that I will listen in at the next opportunity."

This comment from America's highest ranking aviator in a time when aviation is playing the greatest role in history, is but one of many enthusiastic pledges of support that have come from youth leaders, model aero leaders, and aviation figures commending N.A.A. on its J.A.R. organization.

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Modeling Your Future In Aviation

(Continued from page 12)

weight is the limiting factor. Only a certain amount of weight can be carried without limiting performance, so guns and ammunition are designed as light as possible. Usually all unnecessary weight is eliminated from the plane structure to compensate for armament load. Here again is a compromise between firepower and airplane performance.

All guns are fixed in the wings or fuselage, aimed by pointing the whole airplane at the target. Usually no movable guns are carried except in the 2-seater version, called a Fighter, and is used for special types of pursuit work.

The pursuit, briefly, is a small light, high powered single seater with sufficient wing area relative to weight for climb and maneuverability. A typical pursuit ship is shown in Fig. 20. Unlike a bird, notice that the wing extends outward from the lower part of the body or fuselage; therefore it is called a low wing airplane. Some pursuits have wings extending from the center of the body, and others from the top similar to the bird. However, the low wing type is favored at the present time for two reasons.

1.—It is usually faster than other types because of the arrangement of wings, tail and direction of propeller pull. These, in flight, align themselves to give the least resistance to forward motion and the greatest propeller thrust.

The second advantage is structural. All planes must land; consequently some form of landing gear is required, preferably as small as possible, thereby decreasing weight and reducing air resistance when extended. A low wing provides great visibility above and an excellent housing for the landing gear when retracted and a firm support when extended. It also makes possible a short gear because the wings are closer to the ground than in other types.

To design a retractable gear for a high wing plane single engine is a difficult problem because the wings are high off the ground, and the gear being attached to the wings must be long and cumbersome to provide proper clearance between the propeller blades and the ground. The most advantageous attachment for the wings of a pursuit plane is on the center line of the fuselage. In this design, all weights are centered on the thrust line, close to the center of gravity—making the ship highly maneuverable. It also has the advantage of giving considerable clearance between the wings and ground objects.

This is a comfort to naval plane designers because such a type is required for taking off and landing on carrier decks where considerable ground clearance is advisable. This explains at least one reason for the design of the Grumman carrier fighters shown in Fig. 25. Here the problem of a long landing gear has been overcome by housing it in the lower part of the fuselage instead of the wing.

In conceiving a plane, the designer is faced with the problem of deciding upon the performance characteristics to be emphasized; for instance, in the Curtiss Hawk P-40, speed and maneuverability have been considered most essential. Rate of climb is important, but this has been sacrificed to a certain extent to provide armor protection and heavy armaments. Climb could be increased tremendously by taking off the armor and otherwise lightening the ship. As in every case, the final procedure is a compromise resulting in the sacrifice of one needed quality to obtain another.

There has been considerable discussing concerning the relative merits of the Curtiss P40 and the Japanese Zero Fighter. Both are excellent airplanes but entirely different in respect to performance. Actually they cannot be compared. The Curtiss was designed primarily for speed while the Zero was designed chiefly for climb. The Zero is extremely light; all weights—like armor, fuel tanks for long flights, and other equipment—were eliminated or reduced to obtain a high rate of climb. Its speed is not exceptional, only 336 miles per hour. This is due to the use of comparatively large wings which give considerable drag but provide fast climb and maneuverability.

The Curtiss Hawk can outspeed the Zero in level flight by at least 60 miles per hour, but the Zero can outclimb the Curtiss by about 1200 feet per minute. Consequently each plane can run away from the other when required. Though the Zero is very maneuverable it is very vulnerable, while the Curtiss can take great punishment because of its rugged construction and protection for the pilot.

If a high climbing maneuverable pursuit ship is desired, the Curtiss Interceptor 21B shown in Fig. 26 is available. This gives approximately the same type performance as the Zero.

Interceptor

The second type of plane on our list is the interceptor whose purpose is to climb as quickly as possible and engage attacking bombers or fighters. Consequently, its outstanding characteristic must be fast climb, like the Zero, which is actually an excellent interceptor rather than a pursuit ship. The outstanding example of an American Interceptor is the Lockheed P38 shown in Fig. 27. As stated previously, fast climb is dependent principally on great power compared to the plane weight. Lockheed designers have solved this problem by placing two engines in a modification of a single engine type. The total horsepower of this plane is over 2,000, its weight is approximately 10,000 lbs., giving a power loading of 5 pounds per horsepower.

Power loading of the Curtiss P40 is approximately 7 pounds per horsepower. This affords an excellent example of the P38's low power loading. Speed is an advantage to an Interceptor but is always a secondary consideration to rate of climb. Interceptors may be less maneuverable than pursuits provided they are to attack bombers, when great maneuverability is not essential for attack or defense. The P-38 falls in this class. Two engines give high speed but are placed apart necessarily some distance from the center of the plane. Rolls, turns and spins therefore are comparatively sluggish.

Light Bomber

The third plane type is the light bomber, used sometimes as a ground strafer. The Douglas DB7-A shown in Fig. 28 is an excellent example. The qualities of speed and weight-carrying are equally emphasized. In-

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- —At what angle to set the stabilizer.
- —How big to make your plane . . how much power it should have.
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The Author

CHARLES HAMPSON GRANT

—Princeton Engineering School; Massachusetts Institute of Technology; member of the "Early Birds"; for 20 years the world's foremost model flying authority; for the past ten years Editor of MODEL AIRPLANE NEWS.

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stead of utilizing tremendous power for climb, like the Interceptor, the light bomber employs this reserve power to carry heavy loads. As a result, it climbs more slowly but is very fast in level flight, having a comparatively low loading but tremendous power compared to head resistance or drag. It might be considered in the light of an Interceptor strengthened to carry heavy loads, and equipped with movable guns for defense against attackers.

Though tremendously heavy loads of bombs cannot be carried, medium loads can be flown at high speed and dropped upon their objectives. It is fairly maneuverable; so, with movable guns and other armaments, it serves as an excellent ground strafer and anti-tank plane. A slower and less maneuverable bomber is not suited for this purpose.

Its performance requirements are reflected in structure and general design. With comparatively short wings and highly streamlined form, drag is reduced to a minimum, resulting in high speed. Usually two motors developing about 1600 horsepower each provides the great power required for speed and weight-carrying. The structure is necessarily sturdy because of the bomb load, giving strength also for steep dives and maneuvers executed after the bombs have been released.

The wings are high, allowing great visability below, for bombing and strafing troops, tanks or ground installations. The motors are mounted on the wings so the high wings do not necessitate a long landing gear to provide propeller ground clearance.

An unusual feature is the dihedralled stabilizer, with tips raised to reduce the effect of "wash" from the high wing—this makes the plane more stable and controllable.

Next month other types will be considered.

Plans for building a silhouette model glider of the Grumman shipboard pursuit fighter are presented with this article. This is constructed similarly to the bird glider given in Article 2, and the Curtiss observation glider in Article 3. No new operations are required.

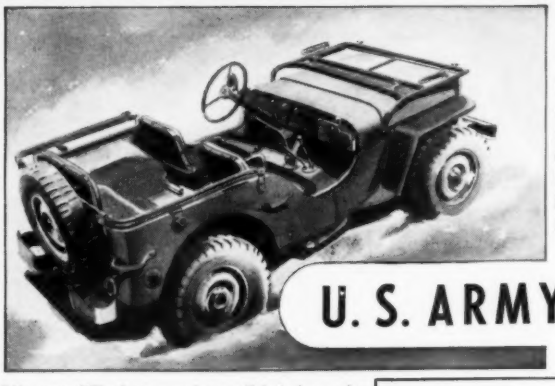
The model may be made of medium hard sheet balsa with parts cut to the correct outlines and assembled with quick-drying cement. The ship is balanced, like the bird glider, by inserting a weight in the nose of the plane. Flying the little ship will not only afford great pleasure but it will also serve as an identification model. When carefully decorated and hung up in your room it appears most realistic.

NOTE: Donald Page of Peru, Vt., tells us that recently he constructed the bird glider, appearing in Article 2, and it remained in flight for 67 sec. At that time it disappeared behind a hill and was not found for three days. This is a remarkable flight for such a small glider and comes close to being a record.

VICTORY

Austin-Craft

ACCESSORY GUIDE



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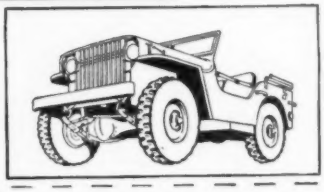

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Air Ways

(Continued from page 35)

ural ability was cultivated to blossom forth in an expression of so-called "genius." For it is hard to believe, though true, that Bobby builds and flies such excellent models as shown in the picture. Every part of this model except carving the propeller and covering the model so as to get it smooth was done by Bobby; advice from dad was thrown in here and there, but the manner in which Bobby is launching his plane in the picture gives evidence of his expert technique. Bobby has built quite a few other models besides this and often helps his father on his gas models.

We modelers of the present age have considered ourselves comparatively expert, but we look forward now with the greatest of interest to the activities of the coming generation who begin to fly ships at 4 years of age.

A picture, 7, of an interesting model was sent to us by C. Kallaway of Tacoma, Wash., Rt. 7, Box 609A. It is a pusher with a 10 ft. wingspan and makes excellent flights, powered with a .60 cu. in. engine. Its weight is 8½ lb. Usually an engine with this displacement will fly models only up to 7 and 7½ lb. When such a heavy plane is flown with this power it is indicative either of a very efficient plane, an efficient engine, or both.

Considerable interest has been taken in building detailed scale models now that model manufacturers have been deprived of essential materials, such as rubber, balsa wood, steel, etc. This has been prompted also by interest in many new planes which have been making world history and which model builders wish to record in model form. One of the cleverest and most realistic scale models produced lately is shown in picture 8. This Navy 1933 Vought Corsair was started by Harold Harvey, who joined the armed services before its completion. It was then turned over to his good friend, Bob Myers, 2221 Blake St., Berkeley, Cal., who finished it and sent us this picture and information. Mr. Myers finished the fuselage, planked and covered it, assembled the parts for the dummy motor, covered the wings and tail assembly, built the landing gear, propeller and decorated it in Navy colors after assembly. Myers says:

"The result, we think, was fair but we did not try to fly it. Unlike many scale models, this was built in complete detail with the exact number of ribs and all parts identical with the big ship. Provision has been made for rubber motor power. The span of this little ship is 28". Hal Harvey, until December 7th, was a gas modeler; now his models are 'grounded' and he is building solid scale models for aircraft identification."

Paul Carlson writes from Nampa, Idaho, and sends us picture 9, showing his amphibian of original design. He says:

"We have ideal flying facilities for such models close to town; the land planes are flown at Dry Lake, hydros at Lake Lowell, a large irrigation reservoir. The picture was taken at Dry Lake after about 12 flights. The model is of 48" spread, 7¼" chord and is powered by a .23 cu. in. engine. The hull has two steps on its bottom. The motor is inverted and mounted on a detach-

able wing. It weighs, complete, 23 oz. It has short pontoon wings extending from the lower part of the body to steady the ship on the water. The climb is very steep and rapid, with a flat glide. For water flying the wheels unsnap and fold up and do not change the balance. Through experiment a decided upthrust was found necessary."

This upthrust is customary where the line of thrust is high, as many model builders well know. With a high thrust the ship has a tendency to nose over; consequently, the thrust line must be turned upward to counteract this nosing over effect.

The fuselage and leading edge of the wing are planked with balsa. Mr. Carlson tells us the takeoffs and landings on water are perfect and are very interesting to watch. Suction on the bottom of the hull on takeoff is reduced by an air vent tube which extends down from the body to the rear of the first step.

A new model club has just been organized at Worcester, Mass., called the Worcester Exchange Model Airplane Club. Recently, to stimulate interest, it gave exhibition flights at the Grand View Country Club. A group of its members are shown in picture 6, after the event. The model unit is sponsored by the Exchange Club to promote the building and flying of model planes and develop basic aviation knowledge gained thereby. Lt. Col. Howard W. Nestor of the U. S. Army Air Force was the guest speaker at a dinner meeting which followed the exhibition. Prizes awarded went to Edward Emmons, Stuart Richmond, Robert W. Heim, Frank L. Shipman and Willard King, Jr. The Club Booster prize, donated by Dr. Charles A. Croissant, was won by Walter G. Irvine.

The San Diego Aeroneers (Cal.) held one of their usually successful gas model contests on May 31st. Gene Ryan "walked off" with first and fifth places in class C. A picture of him with his winners is shown in picture 5. Winners were: Class C: Gene Ryan, 21 minutes 58 seconds; Harold Strawn, Eddie Hume, Frank (Pappy) Davis, Gene Ryan. Class AB: Harvey Patten, 15 minutes 56 seconds; Alfred Faulkner, Bob Glines, Don Lutes, James Squire, Bill Noonan.

The contest was held with a ten second motor run and highest total of three flights. Ryan hooked a thermal on the first flight with his Tiger powered Zipper (the one on his arm in the picture) and only had to make one flight to take first. The week before, while testing the Sailplane on a ten second run, he had a flight of 40 minutes and it landed in sight of the field.

Both of Ryan's ships are the same: a blue fuselage and rudder, a red, white, and blue wing and stabilizer: a combination seen at a great distance on any background.

Al Davis, our Mid-West representative writes as follows:

"U-Control flying made its first Chicago public appearance at Soldiers Field on June 26, as a portion of the 23rd Annual Encampment of the Veterans of Foreign Wars. Exhibitions by Russell Webber and Charley Hein of the Desplaines Sky Wolves, and George Franke of the Chicago Model Nuts, thrilled a crowd of 20,000 spectators with precision and stunt flying of their Fireball models.

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EVERY MODEL OUTLET RECOMMENDS

WAR STAMPS AND BONDS

control line part of the program announce that they will sponsor an All U-Control Contest late this month. Collaborating with the 'Times' in making plans for the contest are: Bob Field, Lee Haase, Josephine Deering, George Franke, David Beck, C. J. Hein, Russ Webber and Quentin Ebel, all ace pilots.

"Milton Burley, 4417 Keokuk Avenue, is a lad who seldom misses a gas model contest and seldom winds up with less than a third place position. At the recent East Moline Gas Model Contest Milt placed second in B class and third in C. With a Forster 29 and a special .305 cylinder head, Milt can make the change on the same motor and fly in both B and C, as he did at this meet, with a slight change in his wing area with tabs. Flying a Swoose with a 60" wing, and a 24" stabilizer designed by Jack Rosen, he has netted three firsts, a second and a third in five contests.

"The newly organized Balsa Bugs (strictly rubber), which meets regularly on Thursday evenings at Garfield Park, announces the election of officers; Steve Moreland, pres., Henry Tracz, vice pres., Earl Takata, secretary and Dave Crown, treasurer.

"Under the banner of the Aviation Coordination Board, Joe Ott, noted model designer, prepared plans for the future activity of model contests for the Junior Victory Army, sponsored by the 'Chicago Herald American.' On July 12th, at Dan Ryans Woods, the JVA Air Meet was held. The rules slightly deviated from AMA procedure and featured a 10 second motor run and one official flight. Three trial flights were permitted, the highest time was adjudged official. The board is composed of officials from the Board of Education, The Boy Scouts, Y.M.C.A., Catholic Youth Organization and the Chicago Boys Club.

"Lawrence Eisele, Naperville, Illinois, 'Gas Hawks' leader, forgot to bring the rudder for his B Pacer to the June 7th contest at Kankakee. However he borrowed a rudder and placed 4th. Other 'Gas Hawks' who practically swept the field were Dick Rechen with second place, and Paul Lindholm, third.

"Although the Model Flying Field site of the 1940-41 Nationals may be lost to Chicago model builders, an encouraging note comes from Park Craft Supervisor F. E. Kardes, who advises that the negotiations have begun for a swap of fields. The new location, if present plans materialize, will be directly south of the present location on 79th Street.

"At the rubber and gas contest, June 21st, sponsored by the Park District, 300 entrants competed for honors. Prizes were books of defense stamps. The contest featured outdoor stick and cabin flying, with no limit on wing loading. Junior Class flying was extended to contestants up to 18 years of age and Senior over 18 years of age. In the A, B, and C, gas model events, Juniors and Seniors competed in one class. Results were:

Class A

J. F. Kehl, 8:10.2.
Carl Goldberg, 6:36.6.
Thomas Anderson, 5:32.9.
William Grice, 4:37.5.
Lawrence Eisele, 4:19.5.

Class B

William La Font, 7:31.7.
Walter Gregg, 7:11.6.
Thomas Anderson, 6:37.8.
Robert Hamilton, 5:20.7.
Edward Spaulding, 4:55.8.

Class C

Milton Burley, 6:27.1.
Henry Duminie, 6:23.3.
Richard Gravenwood, 5:49.4.
Jack Procunier, 5:19.4.
Elmer Beck, 5:10.5.

Junior Stick R.O.G.

Melvin Melichar, 7:06.0.
Roland Grybeck, 6:58.0.
Dick Campbell, 6:40.0.
Leonard Dandar, 5:17.0.
Tim Elesher, 4:06.6.

Senior Stick

Henry Shapiro, 8:21.3.
Ray Wood, 8:14.8.
Frank Schnagl, 7:09.0.
Otto Curth, Jr., 6:52.4.
William Steinberg, 6:48.9.

Junior Cabin R.O.G.

Barney Le Mar, 7:31.5.
Robert Denton, 6:24.4.
John Gordey, 3:43.0.
Melvin Melichar, 3:39.6.
Dick Campbell, 2:40.0.

Senior Cabin

Ray Berens, 11:39.3.
Alfred Kubellus, 10:15.4.
Otto Curth, Jr., 6:01.2.
Joe Limosani, 5:53.2.
Chester Czyryk, 5:42.1.

Picture 3 shows Jack Procunier with a plane that looks more like a tropical fish than a gas model. However, it proved very practical and is an excellent flier. It provides one great essential that many airplane designers of large ships as well as models fail to realize. That is, an airplane always flies steadier and maneuvers with greater regularity if it possesses vertical keel area; the spoon-shape body of this plane supplies this necessary factor. The wingspan is 6' 3", stabilizer 36" and is powered with a .60 cu. in. engine.

Picture 4 shows Ray Wood of the Illinois Model Aero Club launching his high performance stick model. The fuselage and tail is of original design to which a redesigned version of a Lanzo wing has been added. Flights of more than 5 minutes have been made with this plane.

The largest recent meet of the East was the 4th annual New Jersey State Model Airplane Championships. An account of the meet follows:

Russell Hiltz, representing the Linden Model Aircraft Club, won the senior championship, and Raymond O'Connell, of Iselin, the junior title, in the fourth annual New Jersey model aircraft meet held on July 12th, at the former Cranford airport in Clark Township. The meet attracted 91 contestants from Connecticut, Pennsylvania, New York and New Jersey. It was sponsored by the Linden Model Aircraft Club.

Hiltz, contender in the previous three meets, placed first, third and fourth in the fuselage, glider and stick events respectively, scoring 52 points. He also scored the

longest time of the day for a flight: 6:37.6 in the fuselage event. Michael Gural of Newark, 1941 champion, failed to place in any of the events.

O'Connell, tied with Walter Merrill Jr. of Cranford, also representing the Linden Club, with twenty-seven points, won the Junior title on the basis of total time in the two events. He won the fuselage event with a flight of 2:5.2 and placed ninth in the glider event with 22 seconds. Merrill placed third in the glider event with 39 seconds and fourth in the fuselage with 1:10.0.

Hiltz was given the Linden Rotary Club trophy and O'Connell, the Recreation Commission trophy.

The complete summaries: Senior events. Fuselage: first, Russell Hiltz, Linden, 6:37.6; Louise Cairo, New York City; Jack Beckley, Avenel; Robert Dagand, New York City; fifth, John Snedeker, Dumont. Stick Model: C. Fenn, Carlstadt, 5:29.0; William Fox, West New York; Anthony Becker, Philadelphia; Russell Hiltz; Paul DeGatto, New York City. Glider: Richard Mianny, Elizabeth, 3:26.0; Charles Amnen, Woodbridge; Russell Hiltz; Frank Ehling, Jersey City; Perry Calburn, Jackson Heights, N.Y.

Junior Events: Glider: Robert Smith, Orange, 42:04; Warren Fletcher, New York City; Gregory Higgins, Newark; Garfield Gunderson, Dumont. Fuselage: Ray O'Connell, 2:5.2; Jack Gardner, Avenel; Charles Nier, Avenel; Walter Merrill Jr., Cranford.

Cooperating with the Linden Model Aircraft Club were: Linden Rotary Club, Linden Recreation Commission, Boy Scout Troop 35, Air Youth of America, Air Travel Magazine and R. W. Winans. The meet was sanctioned by the Academy of Model Aeronautics.

Committees in charge included: inspection and weighing, Carl Frank, Edward Gerhardt, Robert Kempt; registration, Phyliss Hilts, Walter Merrill, Sr., Harold Sauer; field committee, Richard Devlin, Arthur Hellsberg, Arthur Duckworth; flight recording, Elmer Granitzki, Fred Mashberger; refreshments, Don Baird, Arthur Hellberg; timers, Carl Tobin, Jack Sellers, Jack Telkach, William Johnson, Albert Carpin; messengers and plane spotters, Boy Scout Troop 34 members Howard Martinson, Donald Martinson, Thomas Long, William Bettiger, and Robert Roedell, their scoutmaster; contest director, Frank M. Krysiak.

A number of interesting pictures and features of the meet were photographed by our staff photographer, Mr. Harold Kulick. Picture 1 shows an interesting stick model with elliptical wings and tail, designed by Bob Dagand, who is shown holding the plane. Wings are of the type made from one sheet of balsa with the center cut out and ribs inserted. The cutout portion is then covered with paper, top and bottom. A one blade folding prop is used.

Picture 11 shows Roger Capwell's glider being towed along by one of his friends. In the picture it looks quite small but actually it is a very large ship with excellent soaring qualities.

Picture 10 shows a tense moment in the fuselage event; here you see a contestant starting his model on a perfect takeoff.

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Picture 12 shows the happy Junior winners of the contest. They are, left to right: Ray O'Connell, who won the fuselage event and was high point winner, and Bob Smith, the winner of the junior glider event.

Picture 13 shows the Senior winners. They were, L. to R.: Dick Miannay, senior glider winner; Russ Hiltz, high point and senior fuselage winner and Cliff Fenn, fuselage winner. Mr. Hiltz evidently won a prized skin of rubber, which is hanging around his neck, besides trophies.

Anthony Mazzeo of 1223 Ferry St., Easton, Pa., sends us a picture, 14, of his Skyfarer model, built from planes in MODEL AIRPLANE NEWS. Modeler of the Easton Model Aero Club, of which Tony is a member, fly regularly. They held one of their interclub meets in the middle of July. Mazzeo says that Easton, along with Bethlehem and Allentown, used to be great model building cities and now they are trying to regain their forger prestige. They are doing a great deal of experimenting with original designs with the hope of discovering some new interesting features. It expects soon to hold an invitation meet and would like to hear from any club which is interested in competing with them.

Picture 15 shows some of the members at their recent interclub meet.

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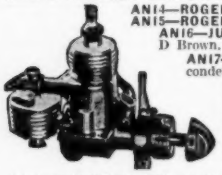

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Michigan

The 18th annual Metropolitan Detroit School Outdoor Model Airplane Contest was held on May 23rd at the Ford Airport, Dearborn. There were 100 entries and 400 spectators. The weather was clear and the wing strong. Prize winners were:

Gas Powered Models

Edwin Schultz, 15845 Whitcomb, Cooley High, age 14, time 212 seconds.

Jim Dromowicz, 9515 Lakepointe, Denby High, age 16.

Jerry Schly, 3201 Gladstone, Cass High, age 15.

Roland Jones, 11682 St. Marys, Cass High, age 15.

Senior Cabin

Paul Barbarich, 670 Schroeder, Western High, age 18, time 219 seconds.

Ted Grabowski, 1653 Elmwood, Cass High, age 16.

Jack Kezelian, 1242 Waterman, Southwestern High, age 17.

Junior Cabin

Joseph Loewengruber, 1026 South Deacon, Hunter, age 15, time 383 seconds.

Pat Green, 4205 Chalmers, St. Johns, age 13.

Gordon Finn, 1109 South Deacon, Boynton, age 13.

Junior Glider

Edward Stoll, 7319 Marjorie, Burroughs, age 14, time 33 seconds.

Pat Green, 4205 Chalmers, St. Johns, age 13.

Bill Baldiga, 1293 Montclair, Foch, age 14.

Special Glider for Boys Under 13 Years of Age

Bill Wolok, 3820 Elmhurst, Durfee, age 12, time 14 seconds.

Erwin Green, 4205 Chalmers, St. Johns, age 9.

Don Gordon, 1319 Lakview, Carstens, age 12.

Alabama

Miss Margaret O. Simpson of the Exchange Club of Birmingham sends us the following report of activities:

"The Birmingham Exchange Club recently staged what we consider a most successful Miniature Air Carnival. Held on Sunday, June 28th, the Carnival drew several hundred aeromodelers for the competition and attracted crowds estimated at 25,000. It provided the South with a spectacle of brilliance, as well as a clear picture of the importance of 'Starting 'Em Flying, as well as "Keep 'Em Flying."'

"The Exchange Club is continuing its active interest in modelers of the state and is presenting each Saturday morning over Radio Station WSGN, a 15-minute broadcast dedicated to model airplane builders. Recently Club presented our Congressmannominate from the 9th Alabama District, the Hon. John P. Newsome, who stressed the value of model aviation to our war effort. Cadet Cornish Underwood and Cadet Keith Plunkett, of the Royal Air Force, in training at Tuscaloosa, Alabama, who have been model builders for years, were heard on a program 3 weeks later."

California

Miss June Dyer of Brisbane, Box 14, sends us information of the East Bay Aeroneers Association club contest, held on July 5th at Heath Field, Oakland.

"The newly introduced 'West Coast Rules' were used, 10 minute flights being the limit.

"Working dethermalizers were compulsory for all ships. As thermals were plentiful, many ships floated away, but were retrieved because of the rule. The very efficient 'parachute type' dethermalizer was predominant. A few ships were lost because of unreliable timers, the heat and altitude causing the timers to stick, making one set for 10 minutes take two or three times as long to work in the air. *(We certainly would appreciate a reliable timer that would be dependable in any weather or altitude.)*

"Motors and club trophies were given for all first places, but every contestant received a valuable prize—a swell contest, all agreed. Winners were:

"Class A: Jack Dyer of Brisbane with his Interceptor powered with an Ohlsson 19; class B: Russell Bayse of Madera, flying his own design with an Ohlsson 23; class C: Paul Romak of Oakland with a Sailplane and Cyclone. Bud Romak won the Westerner trophy for high time of Westerners.

"The East Bay Aeroneers made a huge success of a 'weenie roast,' Sunday, July 12. The ladies did a swell job of feeding the boys. About fifty members and families turned out early, flew till everyone was practically starved, then took over a nearby shady picnic ground, *ate,* and out to fly again at 6 p.m.

"Sort of a new custom with the Aeroneers: Fly in the early a.m.—rest—eat—repair ships—and back to the field to fly until *dark.* The Aeroneers make the best of a *flying day!*

Canada

On July 6th the Windsor Model Aircraft Club held a contest. Bill Clapper of 2289 Chilver Rd., Windsor, Ontario, sends us an account of this event.

"The contest was a huge success, with 200 entrants and 2000 spectators. Despite a brisk wind and plenty of grueling spirals some good flights were made. An outstanding ship was Schultz' 'Mars' with a '60' Custom hauling and howling; the ship went up like a rocket, only faster. On a test flight with motor half-open it made 5:07 without thermals. The 'Mars' was unusual with its aspect ratio of nearly 10 to 1 (8 ft. span). Charlie Fox won the worst crackup trophy in class C; a stuffed mountain goat-head. Ironically it was his own donation for worst crackup prizes; Charlie had been trying to get rid of this atrocious thing for years, so this year he thought he'd seen the last of it. However gravity caught up with his 'Reluctant Wagon.' Bill Baker of Detroit tried to 'crash the party' in class A, and took home the genuine rubber donkey. Lavalle Wolters won it in class B, *definitely.* (Moral: be careful adjusting with a Cannon 300). Winners were:

Class C: Edwin Schultz, William Bristol, Don Paglia, Fred Caton.

Class B: Doug Sutterfield, P. Reaume, N. Chaney, John B. Logan, Esq.

Class A: John Krauer, D. Sutterfield, J. Northmore, B. Gillis, D. Moreau.

Wakefield: Donald Paglia, Lavalle Wolters, Lawrence Soulliere.

Towline: Fred Caton, Don Paglia, R.

Fenwick.

Junior: B. Kendall, John Bickley, J. McLogan.

Cuba

The United States Wing of the Inter-American Escadrille Sends Prizes to Cuba for Model Plane Contest

Interest in model plane building and flying in Cuba attained new heights recently when the Director General of National Sports of Cuba designated May 31st as the national contest date for model plane fliers. Additional interest was created by the presentation of prizes donated by the United States Wing of the Inter-American Escadrille. The prizes were 2 Ohlsson "60" special model plane motors and 2 Playboy Senior Model Plane kits.

Sr. Nelson T. Peláez, Director of the Cuban Wing who is also adviser to Cuban government on aero modeling, in receiving the prizes stated that, "The youth of Cuba has entered into model plane building with great enthusiasm and that the prizes will add greatly to the interest in the competition." The prizes are the first of a series of prizes to be offered by the United States Wing for model plane contests throughout the Latin-American Republics.

Notices

Edmond Hammitt of 58-10 79 Street, Elmhurst, New York, has lost a Brigidier powered with a Cannon B engine. The serial number was 799. If you find or hear of this ship would you kindly communicate with its owner who will pay a reward for it.

Charles Martykan of 3203 S. Keeler Avenue, Chicago, Ill., also reports the loss of a model. His ship had a polyhedral wing and a diamond shaped fuselage to the rear of the wing. It was colored red. The license number on the top of the wing was AMA 11848. It was powered with an Ohlsson "23," No. 15335. A reward will be paid to the finder.

J. McKercher of 921 Azalea, Burlingame, Ca., would like to correspond with other model builders.

Coming Contest

On Sunday, October 18th the 2nd annual North Alabama Model Airplane Contest will be held at the Muscle Shoals City Model Airport; 1½ miles north of the Muscle Shoals TVA Airport. For further information write the Muscle Shoals Modelers, P.O. Box 529, Florence, Ala.

VICTORY

Flash News

(Continued from page 2)

the non-metallic elements. Hydrogen fluoride's value to the nation's war effort, it was said, lies in the fact that it can be used as a substitute for aluminum chloride which is used widely in industrial processes and in the production of 100-octane gasoline and synthetic rubber. Aluminum chloride, it was pointed out, is a compound of aluminum and chlorine, both of which are listed as strategic materials. Hydrogen fluoride, on the other hand, is made from fluorspar, a mineral ore available in practically every country.

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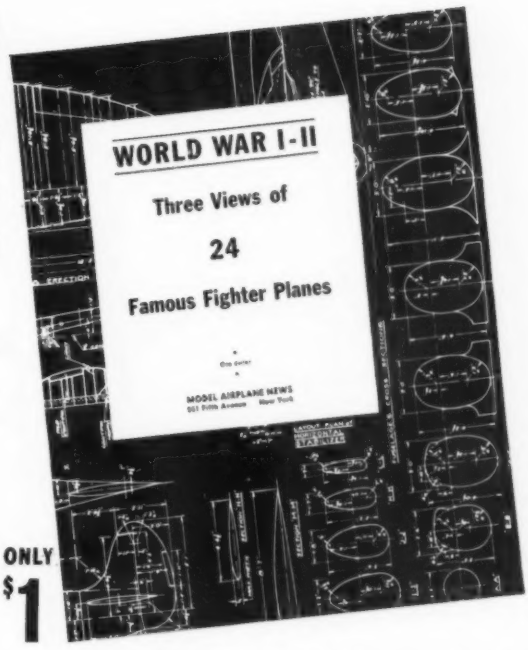
De Havilland 5
Sopwith Triplane
Sopwith Camel
Italian Ansaldo S.V.A.
Nieuport XVII C 1

WORLD WAR II

Martin B-26
North American P-51
Lockheed P-38
Curtiss 21 Interceptor
Curtiss P-40 Pursuit
Bell P-39 Pursuit
Heinkel 112-U
Messerschmitt 109
Spitfire II (2 pages by W. A. WYLAM)
Vultee Vanguard
Boulton Paul Defiant
Nakajima 91



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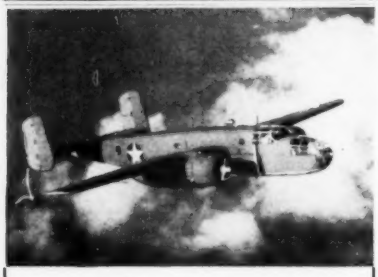

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P. O. Box 214 **Deal, New Jersey**

as cargo carriers making it possible to transport U.S. war materials by air and thereby make it immune from the ubiquitous submarine's torpedos, has aroused wide interest in Washington, particularly with the announcement that Douglas, Consolidated and Martin companies are interested in the project and are willing to cooperate even to the extent of providing the complete engineering for the production. Kaiser's amazing ability to "get things done" and his ability to handle literally thousands of workers amiably and diplomatically make the project at least a sound one. Chief objection seems to be the production of the giant engines necessary for the planes on a production basis with both Wright and Pratt & Whitney straining every working hour, shop and man to the utmost to build enough engines to provide for the thousands of military airplanes now pouring from the aircraft factories. However, present information indicates that Kaiser will soon be building fleets of aerial cargo carriers such as the world has never seen.

A new opportunity for civilian aviators to get, without cost, sufficient flight time and instructions to qualify for a commission in the Naval Reserve and assignment to Naval flight duty, was recently announced by the Navy Department. Men selected for this training will be assigned by the selection board to Civilian Pilot Training Courses. Sufficient flight time and instructions to qualify them for Naval Reserve Commissions in Class A-V(T) will be given each candidate. Duties of officers in this class are instruction and ferry work. Applicants should have at least 80 hours of flying time and preference will be given those with a partial college education. Both married and single men are eligible. If interested write the Navy Department, Washington, D.C.

Men between the ages of 27 and 37 who have been selected for Civilian Pilot Training may now enlist in the Army Air Forces Enlisted Reserves, the War Department states. Similar reserve enlistments will be accepted from men who are in the 18 to 27 age bracket. Applications for enlistments must be accompanied by certificates signed by regional C.P.T. director noting the applicant's acceptance for civilian training. When called to active duty all men so enlisted may be given assignments as instructors, glider pilots, service pilots or ferrying pilots.

In a recent radio broadcast, Glenn L. Martin, pioneer aircraft designer and manufacturer, president of the huge Baltimore plant bearing his name, stated: "There is no limitation on the ultimate size of flying boats." His 70-ton Mars dreadnaught recently took the air for its test flights, one of the largest airplanes ever built. "After the 70-ton Mars will come a 125-ton flying boat and after that one of 250 tons." Flying boats of this nature, Martin claims, could carry 150 fully armed soldiers with necessary equipment to any point on the face of the globe and could be turned out at any rate required if materials were made available.

To speed up the training of Navy ground crews, The Navy has announced the construction of two new aviation training schools to be located at Memphis, Tennessee and Norman, Oklahoma. When completed, these new schools will be capable of training a total of 20,000 men every six months. Enlisted men with technical backgrounds and abilities will be assigned to the school and classes will start immediately upon completion of facilities for the training of such specialists as aviation mechanics, metalsmiths, ordnancemen, radiomen, photographers, aerographers and bombsight mechanics. Additional facilities will also be made at the Navy's present technical schools at San Diego, Alemeda, Chicago, Detroit, Jacksonville and Pensacola.

That famous Fourth of July bombing by American Air Force fliers against Nazi airdromes and facilities near Valkenburg, Germany reveals an interesting story of its "preparation" reading like a fiction novel. The Americans, newly arrived in England, were visiting an R.A.F. station where they did a few hours of practice flying. Hospitably, the British airmen at the field asked the Americans if they would like to take part in an air raid since it was July the Fourth which needed celebrating. The Yanks yelled "Yes!" and piled into six of the 12 fueled and ready Douglas Boston bombers sitting on the field. The Americans cut loose from the formation somewhere over the Channel and started out on their own. Their Boston light bombers operated over a much greater distance than R.A.F. practice in the past has been and in order to reach Valkenburg the Americans had to penetrate more than 150 miles over Nazi occupied territory. The raid was a spectactular success but it is not likely to be a pattern for future cooperation between American and British flying organizations. "Too risky" said the British. "Boy, what fun!" said the Americans.

VICTORY

Aviation Advisory Board

(Continued from page 31)

wing area in gas models. A model with this setup should glide perfectly.

If the adjustment is not correct for power flight then the thrust line can be changed. In such a condition it is necessary to give it more negative thrust, up to 1 degree relative to the stabilizer.

Question: At what angle does the Grant X8 have its maximum lift-drag ratio?

Answer: The Grant X8 has never been tested in the wind tunnel and the maximum lift-drag ratio has not been determined exactly. However from free flight experience the angle of maximum L/D is approximately 4 degrees.

Question: If a straight taper were used would this be inferior to a double ellipse and would the difference be noticeable?

Answer: The double ellipse, as far as can be determined, is the most efficient form of wing; however the difference between this and the straight taper is very slight and would not be noticeable.

Question: What propeller dimensions would you suggest if the powerplant is a Brown Jr.?

Answer: Propeller should be about 15" in diameter, with an 8" pitch, the blade width being about 1/10 the diameter. If the minimum flight speed of your plane is less than 20 mph, a pitch of 7" should be used with a diameter of 16".

Question: Does raising the stabilizer above the thrust line constitute an advantage?

Answer: Yes; this increases the effect of the fin area which eliminates the blanketing of the fin usually taking place during turns and spins when it is above the stabilizer.

Question: In the event of a 1/4 hp. motor being used instead of 1/5 would the motor mount be raised slightly?

Answer: Not necessarily. If the thrust line coincides with the line of resistance there would be no change in the motor mount. If the wing is parasoled, usually the line of resistance is above the line of thrust. In such a case the motor should be raised a distance equal to 1/5 the distance between the thrust line and line of resistance.

Question: The Grant X8 has the undercamber carried back to about the 80% mark. Is this to limit the center of pressure travel?

Answer: Yes. The upward curve of the undersurface at the rear reduces the c.p. travel by increasing the lift of the rear part of the wing at high angles of attack. This keeps the c.p. from moving too far forward and tends to prevent stalling.

John C. Stiles of 9 Rowan Road, Summit, N.J., asks a few questions:

Question: I have plans for a stick model with a single blade prop. How can I figure the size of a two blade prop for the plane?

Answer: A single blade prop should have about 50% more total blade area than a two blade prop; usually the area of single blade props is too small. However, if your single blade operates efficiently give each blade of the two blade prop 2/3 the area of the single blade; both blades having an area of about 33% greater than the total of the single blade.

Question: What is the advantage, if any, of a one blade prop over a two blade prop on a rubber model?

Answer: There is a distinct advantage to a one blade prop; the action which increases its efficiency is typified by the comparison of a monoplane and a biplane. The distance between the impulses as the model moves forward is greater when a single blade is used; thus a single blade prop acts on air which is not disturbed or moving backward. Thus its effect is greater.

Question: There is only room for a 10" prop on my gas model, but would like to increase it to an 11" prop. How will I do it?

Answer: It is not necessary to use an 11" prop; increase the area or each blade of the 10" propeller by about 25%. A propeller can be made more effective for heavy loads by either increasing its blade area or diameter.

VICTORY

Gliders for War!

(Continued from page 7)

gliders has changed almost overnight. We have suddenly awakened to the fact that in the widespread use of large gliders we have the solution of warfare's complicated transportation problems—not only the transporting of cargo but of troops and equipment for invasion. The possibilities are limitless.

There was a great deal of excited talk about Hitler's "Secret Weapon" when the Germans used gliders in the invasion of Belgium in 1940 and later in the taking of Crete in May 1941. Talk has now given way to action.

At Wright Field there is a Glider Unit working day and night testing and flying and perfecting gliders of all types, from small trainers to large troop-carrying ships.

At factories in St. Louis, Wichita, Elmira and a dozen other places gliders of a size and capacity that will astonish even the glider conscious Germans are rolling off the production lines.

At preliminary schools in Kansas, Arkansas, Oklahoma, and South Dakota thousands of men are being trained in power-off "dead stick" landings to prepare them for the job of piloting big war gliders.

At advanced schools in Texas and California full fledged glider pilots are being graduated in large numbers, trained in the art of bringing down their gliders on any available patch of ground.

At our Tactical Training Centers huge troop-carrying gliders and their pilots rehearse with the air-borne troops that will be their "cargo."

Yes, the American glider is definitely ready for war.

Now a glider is of no earthly, or rather aerial use unless there are means for getting it aloft. The glider's power plant is the tow airplane. In fact, an aeronautical engineer recently pointed out that a glider is simply an airplane with a remote power plant.

The towing, once the glider is in the air, and the setting free by the pilot when the enemy objective is reached, presents no real problems, but getting the glider aloft—the pick-up from the ground—does, or did,

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Higher R.P.M. . . . a Longer Flight!

This new Super-Power Fuel is a scientific mixture of high-quality gasoline and fine lubricating oil. It gives quicker starts at high or low temperatures . . . greater climbing power . . . higher R.P.M. . . . a longer flight . . . *all proved by scientific laboratory tests!*

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present its difficulties.

First there was the problem of the take-off for the tow airplane. The added weight of the glider called for a longer runway. With a train of two or three gliders in tow it required a runway longer than is ordinarily practicable, especially for operations from our fighting fronts.

Then there was the all-important corrollary to the first problem; getting the glider and its occupants off the ground again once the mission behind the enemy lines was accomplished. Were gliding missions to be one-way tickets with no means of getting out in a hurry? Were costly gliders to be destroyed or abandoned to the enemy in case of reversals? Wasn't there some way in which gliders landing in small fields could be unloaded and then brought back to deliver more troops?

Until recently these were both real problems. Now the Army Air forces is experimenting with a non-stop glider pick-up by means of which our gliders that go to war will be able to come back when their job is done, and load up again.

Pick-up Systems

This pick-up system is simplicity itself. It is an adaptation of the mail pick-up by an airplane in flight, widely used for years.

A few weeks ago the writer witnessed a highly successful demonstration at Wright Field during which a two-place glider was picked up from the ground time and again by a power plane zooming low at more than 100 miles an hour. The demonstration didn't attract much attention, but its significance from a military point of view is clear-cut. What is accomplished by a small airplane picking up a small glider can be duplicated by a large transport airplane picking up a war-going glider or train of gliders. The principle is the same. All that is needed is larger and stronger equipment.

The essential ground element of the non-stop pick-up device is a set of posts resembling the goal posts on a football field, except that instead of the cross bar a tow line—one end attached to the glider—is suspended between the poles.

The actual pick-up mechanism is in the airplane and consists of two parts, a revolving reel or drum on which 700 feet of light cable is wound and a 12-foot pick-up arm with a grapple hook on the end attached to the bottom part of the fuselage.

The tow plane comes in and as it approaches the pick-up ground station, the pilot levels off much in the same manner as he would in making a landing, except that his speed is greater, anywhere from 95 to 120 miles an hour. He lowers the pick-up arm, and as he swoops down the hook at the end catches the suspended tow-line. At the moment of contact, with the airplane from 12 to 14 feet above the ground, the cable reel inside the plane is permitted to spin freely, paying out additional tow-cable to cushion the initial load imposed by the dead-weight of the glider. Some of the shock is also taken up by the tow-line itself, which is made of nylon to give maximum strength with a high degree of resilience.

Gradually the reel-brake is applied, the glider accelerates smoothly, and by the time the speeding tow-plane has levelled off, the glider is air-borne. Then the brake is locked and the glider is in full tow. If at any time while the glider is in tow the acceleration becomes greater than 1 G. an automatic shock absorber goes into action.

No Shock or Strain

During the demonstrations at Wright Field, even with the airplane making the pick-up at more than 100 miles an hour, there was no noticeable shock or strain on either the airplane or the glider.

Lest this solution to the pick-up problem makes the job of the glider pilot seem simple, don't forget that there is no mechanical device that will bring the glider to a perfect landing within the limits of a small pasture behind the enemy lines. That is up to the skill and judgment of the pilot.

When he once cuts loose from the tow-ship, 5,000 or 10,000 feet up, miles away from the small pasture that is his objective, the glider pilot is on his own. He must know air currents, rate of glide, and the performance of his glider. As he silently glides down, carrying his precious cargo of men and guns and ammunition, responsibility for the success or failure of the mission is his alone.

Top Man

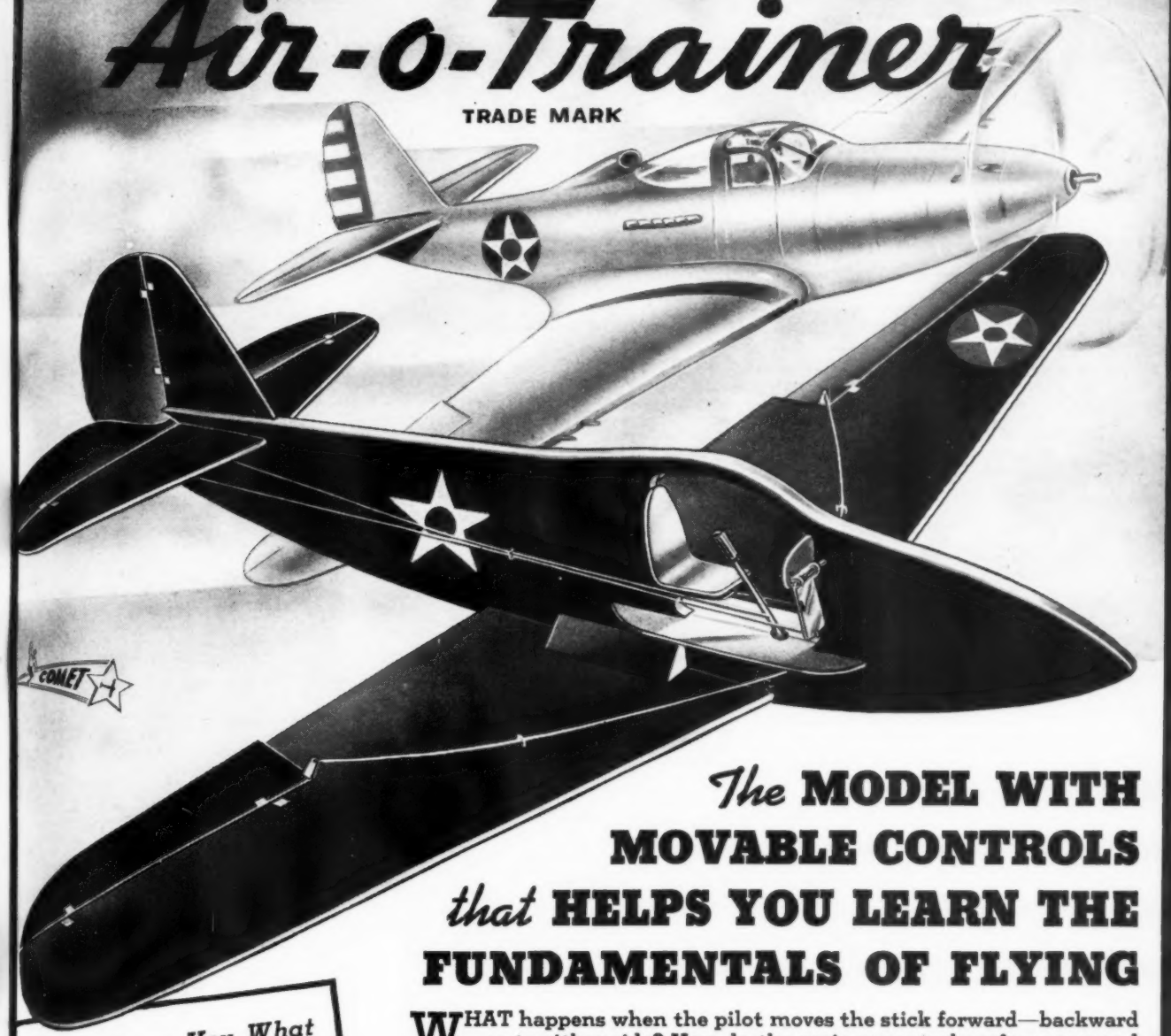
It is true that the Army Air Forces' troop-carrying gliders are equipped with flaps and spoilers to cut down the speed and increase the rate of glide, but if the pilot misjudges and undershoots his mark there is no engine to throttle and gain altitude for him. That is why the glider pilot will be the top man in the air-borne troop invasion on the books of our high command.

VICTORY

[PRINTED IN U.S.A.]

Announcing the COMET Air-o-Trainer

TRADE MARK



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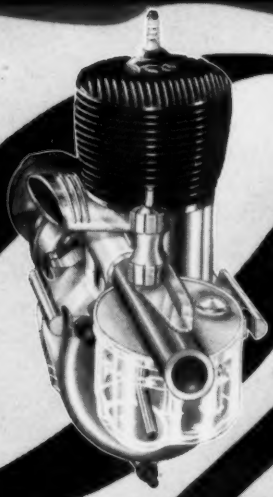

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